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INFORMATION LIABILITY: NEW INTERPRETATIONS FOR THE ELECTRONIC AGE*

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I. INTRODUCTION

A. STATEMENT OF THE PROBLEM

Information liability hinges on two questions: who is responsible for creating and providing accurate information for third-party consumption; and, to what extent is the creator and/or provider actually liable for the quality of that information? This article will consider these questions with respect to electronic information (particularly interactive archival databases) and suggest some ways in which the issues involved may be formulated and resolved, emphasizing the marketing, product development, and legal aspects of the questions.

Historically, information liability has been a matter of concern primarily to journalists because of libel laws. Why is it now a question of broader concern? Today information is considered an asset with economic value. Consumers now make multimillion-dollar decisions based on information obtained for a fee. Increasingly, dissatisfied consumers of all types turn to litigation to recover real or perceived damages.

The information industry is estimated to generate as much as $12 billion in annual revenues. Of this, online services and databases account for $4.6 billion.[1] Therefore, for the producers and distributors of information, issues of information liability (especially when litigation is involved) can have a major impact on costs and revenues. For purchasers and users of this data, the costs and risks of consumption are high. Americans' increased litigiousness, the new definition of information as an asset with economic value, and the "deepening pockets" of the information industry combine to make information liability a compelling issue.

The change from traditional print and broadcast media to machine-to-machine distribution of information has spawned an explosive growth in the amount and complexity of available information. It has also increased the number of information consumers and has multiplied the number of links in the chain of data creation and distribution. Yet, because electronic distribution of information is relatively new, there is little precedent in either law or convention for the assignment of qual-

1. INFORMATION INDUSTRY FACTBOOK 2 (Maureen Fleming et al. eds., 1989/90 ed.) (Stamford, CT: Digital Information Group).

ity responsibility. (A complete definition of "quality" follows in the next section.)

Information consumers want reliable data on which to base decisions. This is not new. For years readers of newspapers and magazines have demanded accurate reporting. The broadcast media have been subjected to similar rigorous standards of accuracy. Most people seem to accept a certain degree of inaccuracy in traditionally distributed information, although the law has placed limitations on acceptable levels of accuracy and upon intent in publication.

With the advent of broad electronic distribution of data, however, has come an attitude change. Many users of online data believe that because it comes out of a computer it must be 100% accurate and that any lower level of accuracy is unacceptable. Of course, data accessed from a computer is only as good as the data that goes into it, and electronic transmission and manipulation do not magically improve data quality. On the contrary, they may actually diminish its quality. However, the myth of machine infallibility seems to create a demand for a higher standard of quality for machine-readable data than for traditionally distributed information.

Quality in a publishing endeavor is complicated by the number of steps in the production and delivery process. At each stage something could go wrong and legal and market-perceived liability could be fixed thereon. As a consequence, several groups share concern over information liability. Librarians and other information professionals worry about their personal liability for providing inaccurate information. Information producers and distributors worry about the corporate implications of market dissatisfaction and possible litigation. The potential scope is enormous.

This article will examine each of the links in the "information chain" (defined below) and evaluate the impact of information liability upon the actions and manner of conducting business for each link in the chain. By interviewing representative key players in the information delivery chain, the author seeks to identify issues of common concern across the industry and those issues that are of concern only to specific links in the chain. By so doing, the writer identifies such general consensus as may exist about the nature of these issues as well as existing solutions that have been developed to deal with them. Existing and proposed solutions are critically evaluated. The article concludes with the open questions that confront the industry and with recommendations developed in order to better meet the needs of the industry and the markets it serves.

The research upon which this article is based is the first known systematic and empirical study of an increasingly important subject. Infor-

mation liability is receiving growing attention not only among information purveyors and consumers but also among insurers and the U.S. courts. Therefore, this work is expected to add substantially to the development and critical evaluation of processes and procedures for dealing with this important issue.

B. Definition of Key Terms

For the purposes of this article, *liability* is defined as both a legal concept (circumscribed by law, regulation, and precedent) and as a "marketplace" responsibility whereby the consumer expects a certain level of quality and subsequent satisfaction from the use of the information provided. *Quality* includes the fidelity or accuracy of data (for example, no typographical errors), the consistent application of well-defined structures to information (such as index terms in bibliographic citations, editorial guidelines for the inclusion or exclusion of certain data, and the manner of representing numeric information), and fitness of purpose (the ability to satisfy a particular need).

In order to describe and review systematically the process of creating data and delivering it to an end user the analogy of the *information chain* is used. This consists of several links, each with particular functional responsibilities:

1. The author (original data creation or collection),
2. The database publisher (creating derived data and structuring the database),
3. The database distributor (data storage and access),
4. The search intermediary (query structure and information retrieval),
5. The end user (application of the information), and
6. Data communications (connecting each of the links).

First, an author creates or collects the data. A reporter for TIME magazine, for example, may write an article on the latest round of congressional budget debates, or a company may write a report to be filed with the Securities and Exchange Commission. Whatever the source, the author creates a body of information for publication and distribution to a larger audience. The publisher promulgates the author's work. At this point, a single standard of accuracy applies to the information, the raw data.

Now, track this same TIME magazine story through the production of an online bibliographic database. The story next goes to a database producer for indexing and possible abstracting. A professional indexer/abstractor reads the story, assigns index terms, abstracts the article, and includes the bibliographic information that allows a reader to either cite the article or track it to its original source. In some instances, the en-

tire text of the article will be scanned or retyped for digital storage and attached to the index or abstract information.

Next, the database producer structures and formats the data so that a databank can load the information into its mainframe computer for distribution to users. This may involve data transmission over phone lines or via satellite, or the delivery of magnetic tape to the databank.

Once loaded into the host's mainframe, a telecommunications network distributes the data to consumers. Data transmission can involve multiple links: from a user's office-centralized phone system, to the local phone system, to a packet-switching network dialing into the host computer. An interactive search system requires that information flow both ways; it is not a one-way delivery of data. The information seeker sends queries for information and the databank returns information in response to those questions.

Finally, the data is delivered to the information consumer, where it may be viewed on a screen, printed out, or saved electronically for future reference. It may be passed on to someone else, it may serve as a starting point for future research, or it may be discarded as useless. In any case, it usually serves some purpose in a decision-making process, and therefore the accuracy of the data may have a far-reaching impact. There may actually be two layers of the information consumer: the intermediary and the end user. Intermediaries often request the information on behalf of an end user; e.g., a reference librarian (the intermediary) conducts an online search about competitive pricing information for a product manager (the end user).

C. THE ONLINE INFORMATION INDUSTRY: BACKGROUND

The information industry, in its broadest definition, includes all print, broadcast, and electronic information distribution and processing. This definition is too broad to be useful for most purposes, except to say that it is important because it is big. However, a brief description of the online information business would be useful.

It can be said that the online database business has been in existence for less than twenty years and has only come to be recognized as a substantial commercial enterprise in the last ten years. The commercial online database industry grew out of databases and search-and-retrieval systems developed by information specialists and programmers for internal company use. At a certain point, the size and scope of these internal databases were recognized as having a broader appeal. Commercialization became a means of recovering some of the investment made in these hitherto private information banks. For example, the proprietary search system utilized by Dialog Information Services, now owned by Knight-Ridder, was developed under the auspices of

Lockheed Aerospace Company under contract to NASA to document the agency's extensive files.

Several key technological advances have made the growth and popularization of online searching possible: far-reaching, dependable telecommunications networks, powerful mainframe computing, lower-cost data storage, and the proliferation of personal computers. Widespread, reliable, public-access packet-switching networks for high-speed data transmission have made it possible to move information between searcher and the data repository at an acceptable cost and speed. Larger databases require more efficient, increasingly inexpensive data storage for cost-effective utilization. More powerful computers, capable of efficient execution of a complex search strategy, and rapid data retrieval further contributed to the growth of the business.

Finally, the availability of the modem-equipped personal computer that can be used as a terminal for interacting with remote databases has put computing power on the desks of many hitherto uninitiated searchers—without requiring a significant investment in hardware or software. Faster modems, enabling more rapid transmission of data, are inexpensive and easy to obtain. The user's biggest investment is time to learn how to retrieve desired information.

This ready accessibility is reflected in the increase of subscribers to online services: from the end of 1984 through the end of 1988, the number of online subscribers grew from 1.152 million to 2.618 million.[2] This growth rate ranges from 13.2% to 38.9% per year.[3]

Commercial database creators are usually publishers of some sort, varying significantly in size and scope. Many produce their data for distribution in several media. Print is usually the primary medium while the electronic medium is only a secondary development. Names as recognizable as McGraw-Hill and Time, Inc., as well as lesser-known companies, such as ABC Clio (a publisher of historical indexes) and FIND/SVP (a market research firm producing customized and syndicated research reports), would be included in the ranks of database creators.

Database producers or information providers are distinguished from database distributors or online services by the nature of the services provided. Database creators provide content—the information itself—while online services actually distribute the content. In the print world, a publisher and book manufacturer would be analogous to the database producer, while the bookstore parallels the database distributor. To make the analysis more interesting, a number of significant online distributors are also information providers in their own right. Dow Jones, for example, distributes the content of the Dow Jones wire serv-

2. *Id.* at 229.
3. *Id.* at 230.

ices through Dow Jones News/Retrieval, integrating the two links in the information chain.

The growing economic importance of the online information business is evidenced by the fact that revenues from online services grew 174.3% between 1984 and 1988, while database sales increased 68.9% during the same period.[4] The 1988 annual revenue for databases and online services combined was $5.15 billion. Excluding airline information and reservations, the total still exceeds $4.6 billion.[5] Given its size and growth rate, the online information industry stands increasingly vulnerable to the problems of information liability.

D. LIMITATIONS OF THE STUDY

The challenge with this research was to limit its scope. With the rapid advances in electronic data technology, more and more questions arise with respect to information liability. This paper focuses on interactive archival, textual databases centrally stored in a location remote from the end user (usually on a mainframe computer) and accessed by public-access packet-switching telecommunications networks or virtual private networks dedicated to a specific online distributor.

It does not address issues related to real-time, one-time delivery of information such as newswires or real-time stock quotations, nor is its primary focus on numerical or statistical data. Furthermore, although technical advances now permit the local storage (on a personal computer hard disk, local area network server, CD-ROM, laser disk, or other media) of massive quantities of data and means of access other than packet-switched networks, this article will not address the questions of information liability in these areas.

Except in passing, the questions of liability for computer bulletin boards (also known as forums, roundtables, chat lines, etc.) will not be addressed as they do not meet the strict definition of interactive database that has been established for the purpose of this discussion.

While consumer database services may be considered tangentially, the concentration of the paper will be upon business/professional databases and services such as those provided by DIALOG, Mead Data Central, and Dow Jones News/Retrieval. Games, entertainment services and electronic shopping malls, often associated with consumer online services, fall outside the parameters of this study.

The consideration of legal issues is restricted to United States law. Different standards of law often apply in other countries and, while the United States leads the world in the development and distribution of

4. *Id.* at 48.
5. *Id.* at 2.

online information, there is no reason to presume that U.S. practices will prevail in other jurisdictions.

The questions of copyright protection and personal privacy are not a primary focus of this analysis. These topics, in and of themselves, do not materially contribute to the resolution of quality problems and responsibility among the links in the information chain. However, who owns material with the ensuing right to license republication does have an effect upon speedy resolution of quality problems. In this respect, copyright ownership will be considered.

While quality control and assurance software programs are one focus of this study, discussion will be limited to the conceptual level. The research reports what they do, not how they accomplish the task. The proprietary nature of these programs (each customized to meet the unique requirements of specific organizations) precludes a detailed description of how they actually work.

E. Organization of the Presentation

The article is organized in five parts. Part I introduces the problem, defines key terms, states the limitations of the study, and summarizes the organization of the presentation. Part II reviews existing literature on the subject of information liability, quality control, and related areas. Part III describes the methodology used in the research and Part IV presents the research findings. Part V analyzes the research findings, critiques existing and proposed solutions to the problems of information liability, and concludes with this writer's synthesized solutions.

F. THE INFORMATION CHAIN: A MODEL FOR ANALYSIS

LINKS IN THE CHAIN	EXAMPLES OF PLAYERS
- functions performed	
AUTHOR	WRITER FOR *TIME*
- original data creation - data collection	
| ------ DATA COMMUNICATIONS*	
DATABASE PRODUCER/PUBLISHER	DISCLOSURE BIOSIS INFORMATION ACCESS CO.
- indexing - abstracting - editing - full-text data conversion - date structure for online access	
| ------ DATA COMMUNICATIONS	
DATABASE DISTRIBUTOR/SEARCH SERVICE	DIALOG MEAD DATA CENTRAL INFORMATION AMERICA GENIE
- data storage - data access - information retrieval software - host computer	
| ------ DATA COMMUNICATIONS	
SEARCH INTERMEDIARY	SEARCHLINE AUBERGINE INFO. LIBRARIAN
- source selection - query structure - iterative searching - information retrieval	
| ------ DATA COMMUNICATIONS	
END USER	THE RESEARCHER ATTORNEY
- application of information	

*EXAMPLES: BT TYMNET, GEIS MARK*NET

II. REVIEW OF THE LITERATURE

A search of the academic and popular literature indicates a growing awareness but no exhaustive treatment of information liability or the related topic, quality control, for electronic databases. An annotated bibliography on the subject was published in December 1988, yet most work to date is not precisely on point. Other than the dissertation upon which this article is based, the author has found no dissertations or theses that cover this topic. Most of the legal literature does not reflect the state of current technology.

The current literature can be divided into several categories:

1. Librarian/information specialist malpractice or professional liability issues and risks,
2. Legal opinion, including case law, on database producers' and database distributors' liability for accuracy of information,
3. Database quality as a conceptual issue, and
4. Database quality as a practical issue ("how to").

A. LIBRARIAN/INFORMATION SPECIALIST MALPRACTICE

Anne Mintz, in a series of articles, explores the growing reality of professional liability for information professionals. She contends that because the practice of "information service" is not licensed there are no generally accepted standards for adequate performance (comparable to a CPA for accounting or admission to the bar for law), and thus, information professionals are at risk for malpractice suits. She considers malpractice insurance, generally unavailable, as a possible hedge against this risk.[6] In her later article, she recommends that information professionals specifically contract with clients in order to protect against lawsuits. Further recommendations include continuing education for library staff to improve skills and, again, the purchase of malpractice insurance.[7]

William Nasri states that the paucity of malpractice suits against librarians is because librarians do not have sufficient assets to make the suits worthwhile, but the risk is nevertheless quite real because of greater reliance on information by corporations and institutions. To reduce risk, Nasri recommends counseling patrons on the types of sources

6. Mintz, *Information Practice and Malpractice. . . Do We Need Malpractice Insurance?*, ONLINE, July 1984 at 20.

7. Mintz, *Information Practice and Malpractice*, LIBRARY J., Sept. 15, 1985, at 38. *See also* Mintz, Information Practice and Malpractice. . . Do We Need Malpractice Insurance? (paper and open forum presented at Online '84 conference, San Francisco, Sept. 30, 1984, taped).

used in the search and always disclaiming the comprehensiveness of the search.[8]

Teresa Pritchard and Michelle Quigley maintain that, rather than continue the debate about whether malpractice for information specialists is a "valid concern," information professionals should recognize the risk and take steps to minimize their exposure.[9] Pritchard and Quigley maintain that the fact that information professionals are "holding ourselves out as experts and being paid for the expertise . . . creates the potential liability."[10] The authors cite cases on attorney research malpractice and accountants' liability as possible precedents for the specifics of information professionals' liability.

Two types of negligence are defined as possible sources of liability: (1) "parameter negligence"—failing to consult the correct source, and (2) "omission negligence"—consulting the proper source but failing to locate the correct answer. The authors suggest that proper documentation of the research process will minimize the likelihood of a parameter negligence suit. Avoiding omission negligence is more difficult. The authors suggest learning more about the databases consulted, attempting to compensate for likely mistakes, supplying disclaimers provided by the database producers, trying to verify information in another source, and warning the client of potential inaccuracies.

Finally, as a practical step Pritchard and Quigley recommend a written contract with clear disclaimers. They conclude with a discussion of the factors to consider when buying malpractice insurance.

John Everett surveyed several independent information professionals and concluded with four strategies to avoid an information malpractice lawsuit: be competent at what one does; have good client relations; in a client contract, clearly state that "the accuracy and thoroughness of information provided by third parties" (that is, information providers) is not warranted;[11] and consider malpractice or errors-and-omissions insurance.

Although several authors suggest the purchase of malpractice insurance, it appears that no one has been able either to identify a prospective carrier for this risk or to develop sufficient demand for the insurance to warrant an insurer's interest in developing a policy for coverage. While a reasonable theoretical suggestion, malpractice insurance hardly seems a practical solution to the problem.

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8. Nasri, *Professional Liability, in* LEGAL ISSUES FOR LIBRARY AND INFORMATION MANAGERS 141 (W. Nasri ed.) (New York: Haworth Press 1987).

9. Pritchard & Quigley, *The Information Specialist: A Malpractice Risk Analysis*, ONLINE, May 1989, at 57.

10. *Id.* at 58.

11. Everett, *Independent Information Professionals and the Question of Malpractice Liability*, ONLINE, May 1989, at 70.

The general concern seems to be about those intermediaries who provide independent information services, so-called information brokers or research consultants. Less consideration has been given to intermediaries employed by a university or company: the corporate, law, or academic reference librarians who provide search services as part of their normal job responsibilities. This lack of interest does not mean that there is any less risk but suggests perhaps that these persons feel protected by the employing organization from any individual liability.

In addition, these librarians have provided similar services for years with little concern about their "liability" for inaccurate data. Historically, they have relied upon print sources. The exercise of due care in the retrieval of information, whether online or manually, is expected from these staff members. Finally, the "clients" are well known—they are usually colleagues or students within the same institution. There tends to be some sort of ongoing relationship, not primarily a project-by-project or independent-consultant relationship as with independent information professionals. The dictum of knowing one's client and his/her needs is clearly practiced in these situations.

B. Case Law and Legal Opinion

Most case law and secondary legal literature reflects precedents established in other areas of professional liability, such as the professional liability of lawyers and accountants. There are, however, three specific cases that are considered to have direct bearing on the subject of this article.

Dun & Bradstreet Inc. v. Greenmoss Builders Inc.,[12] a court decision reinterpreting the scope of U.S. libel laws, gives database producers and distributors cause for concern. Legal practitioners agree that the case (decided in the 1984-85 Supreme Court session) seems likely to lead to more libel litigation and more uncertainty about how that litigation will be resolved.

A brief summary of libel law helps. Prior to *Dun & Bradstreet*, two categories of plaintiffs existed, with different standards applied for the determination of libel. If a public figure claimed libel, that person would have to prove "actual malice" in order to win a suit. In legal parlance, "actual malice" consists of publishing information with reckless disregard for whether a statement is true or false, or with actual knowledge that a statement is false. By this definition, facts that are wrong are not necessarily defamatory; they may merely be wrong.

A 1974 decision in *Gertz v. Robert Welch, Inc.*[13] had established standards defining libel for different categories of people. As a result of

12. Dun & Bradstreet, Inc. v. Greenmoss Builders, Inc., 86 L. Ed. 2d 593 (1985).

13. Gertz v. Robert Welch, Inc., 418 U.S. 323 (1974).

this decision, even a private figure had to prove that the publication had acted with some degree of fault (though to prevail to the same degree of fault was not required for a private figure as for a public figure). In order to recover damages, actual malice had to be proved. While open to interpretation as to who was a public and who a private figure, and whether or not actual malice was involved, the law seemed to be fairly clear. Then the court decided *Dun & Bradstreet* and all clarity disappeared.

The case centered upon an inaccurate credit report for Greenmoss Builders, stating that Greenmoss had declared bankruptcy. Dun & Bradstreet integrated that false information into its regular credit-reporting system and distributed the incorrect report about Greenmoss to five subscribers. Once the error was reported to Dun & Bradstreet by Greenmoss, all five report recipients were notified of the mistake. Nevertheless, Greenmoss sued Dun & Bradstreet for libel, and as the case went up to the Supreme Court on appeal, won. The Court's opinion in this case overturned some basic assumptions about libel law. In addition, the judgment called for punitive as well as actual damages.

The opinion held that both presumed and punitive damages could be awarded with no proof of actual malice by reading *Gertz* as limited to speech on "issues of public concern," or "public issues" or "public speech." This emphasized the type of speech rather than the public or private nature of the plaintiff. The Court referred to the "content, form, and context" of a publication to separate the public from the purely private concern, finding that the credit report "was speech solely in the individual interest of the speaker and its specific business audience." In short, the Supreme Court agreed that private information producers are not protected by the First Amendment from presumed and punitive damages, in this instance, because it involved "commercial" (rather than "public") speech published to very specific audiences.

Database producers and distributors had watched the development of the case with interest and eventual dismay. While few would dispute that Dun & Bradstreet erred in publishing the incorrect data, the rationale of the Court's finding caused grave concern. According to Paul Zurkowski, then president of the Information Industry Association:

> The Supreme Court has stripped speech involving "private concerns" of the First Amendment protection against presumed and punitive damages, without providing clear guidelines for distinguishing such speech from that involving "public concerns." With this decision, the court has opened a Pandora's Box of potential problems for the intellectual prop-

erty, publishing, communications and information communities in this nation.[14]

A second relevant case, *Brocklesby v. United States and Jeppesen and Company*,[15] held Jeppesen, an aeronautical chart publisher, liable for wrongful deaths and property damage arising from a plane crash in Alaska. The pilot relied on a Jeppesen chart with an erroneous instrument approach procedure. The chart accurately reproduced in graphic form tabular data erroneously published by the Federal Aviation Agency.

Three alternative theories of liability were presented and upheld by the courts against Jeppesen: (1) strict liability, 2) breach of warranty, and (3) negligence. The resulting three issues of concern to information publishers follow.

Jeppesen argued that published ideas are not "products" subject to strict liability if defective. The court disagreed, finding that a publication, at least one that could be dangerous if used as intended, could be covered by the doctrine of strict liability.

Jeppesen also argued that it should not be liable because it correctly reproduced Federal Aviation Agency information that was defective due to government fault. Here, the court held that Jeppesen could be held strictly liable on a no-fault basis.

And the court found that Jeppesen may have been partially at fault for not independently verifying the government data. If this assertion holds true, then full-text publishers are particularly at risk because they "reproduce," without any editorial verification from a content perspective, thousands of articles per month.

The court agreed that it was unfair to hold Jeppesen strictly liable for accurately republishing the government's data, stating, "If, for example, a trade journal had accurately published the government's instrument approach procedure in text form and a pilot had used the procedure as printed in the journal, the journal would be immune from strict liability."[16] However, "Jeppesen's charts are more than just a republication of the text of the government's procedures. Jeppesen converts a government procedure from text into graphic form and represents that the chart contains all necessary information."[17] For information providers that add bibliographic information to full-text records or even change the format of an article to make it more easily retrievable, this decision has chilling overtones.

14. Paul Zurkowski, quoted in *Supreme Court Rules in D&B v. Greenmoss*, ELEC. INFORMATION REP., July 1985, at 1.

15. Brocklesby v. United States, 767 F.2d 1288 (1985).

16. *Id.* at 1297-98.

17. *Id.*

A third case, that of *Daniel v. Dow Jones*,[18] ruled on a suit brought against Dow Jones News/Retrieval Service for a false news report. The plaintiff retrieved a news item about a Canadian corporation, where prices of a restructuring transaction were reported in Canadian dollars, but not so identified. The plaintiff claimed that he made a bad investment based on the report and sought recompense.

The court found that the plaintiff did not have a "special relationship" with Dow Jones simply because he had contracted for its services. In fact, "the relationship between the parties here is the same as between any subscriber and a news service."[19] Therefore, the public policy supporting First Amendment protection of the media, which requires actual malice be proved before damages can be awarded, prevailed in this case.

The court concluded that Dow Jones News/Retrieval Service was "entitled to the same protection as more established means of news distribution."[20] In this case, information delivered electronically was judged by the same standards as traditional printed information.

Legal practitioners and theorists have reduced the legal questions for information providers and database distributors to three primary areas: contract law, tort law (or negligence), and strict liability, following the precedents established in the above-mentioned cases.

Denis and Poullet believe that most questions of liability for online information will arise out of breach of contract. They cite two points of interest. First is "the frequent lack of contractual relationship between the initial provider of information and the end user."[21] They suggest that a remedy for the situation is to refer, in the end user/database distributor contract, to the obligations contracted for between the information provider and the database distributor separately. This would establish a link between the ultimate consumer and the original provider, in all likelihood creating a shared responsibility rather than a single point of fault in the distribution chain.

Second, Denis and Poullet critique the use of standard contracts and suggest more meaningful agreements. These agreements should identify risks, define the means for reducing these risks, commit to the solution, and provide financial remedy in the event of nonperformance.

Paul Marett, another supporter of contract law as the protector of electronic publishing, states as much in his article "Legal Issues in Elec-

18. Daniel v. Dow Jones & Co., 520 N.Y.S.2d 334 (N.Y. City Civ. Ct. 1987).

19. *Id.* at 337.

20. *Id.* at 340.

21. Denis & Poullet, *Questions of Liability in the Provision of Information Services*, ONLINE REV., Feb. 1990, at 26.

tronic Publishing."[22] However, he demurs that "even when there is no contractual link, a person who sets himself up as providing information may be liable for loss sustained by a person who relies on it."[23] Marett speculates upon the peculiar nature of electronic databases that would cause a third party to "suffer detriment as a result of fault or negligence on the part of a database provider," pointing out that he cannot "assess how such cases would be treated by the courts."[24]

Outside of contract law arise public policy issues that include defamation (libel or slander). Marett proposes that online services could be held analogous to broadcast, cable, or even print standards (as we have seen in the *Dun & Bradstreet* case) for determining libel. Because plaintiffs commonly sue as codefendants an author, publisher, printer, and even the bookseller, it would not be unlikely to add an online information provider, database host, or network provider to the crowd. The extent of each party's liability, if any, has yet to be demonstrated.

Harry East, in *Designing and Marketing Databases*, describes the legal questions for the database producer as two kinds: defensive and offensive. The defensive questions are "Can he legally do what he is proposing to do? Will he be infringing on the legal rights of others?" The offensive questions are "How can he protect his database, service or publication, from being misused by customers, distributors and competitors?"[25]

The defensive questions reflect issues of ownership of input material, copyright, and legal liability for content. East suggests that database producers "may find themselves at a point where the legal liability parcel stops in their hands unless it is clearly spelled out in their leases and contracts where their responsibilities begin and end" and that they be "indemnified against claims arising from the corruption of their data after its communication has passed out of their control."[26]

While contracts and agreements are the suggested form of protection, East admits that the difficulty is the acceptance and implementation of such terms. It is much more likely that the database distributor will attempt to hold the information provider responsible for all errors in the database or, at the very least, refuse to accept responsibility for "bad" data.

While the legal responsibilities of information providers, database distributors, and information intermediaries have been, to a limited ex-

22. Marett, *Legal Issues in Electronic Publishing*, in 4 OXFORD SURVEYS IN INFORMATION TECHNOLOGY 1 (Oxford: Oxford University Press 1987).

23. *Id.* at 8.

24. *Id.* at 19.

25. East, Designing and Marketing Databases 120 (British Library Research Paper 7) (London: British Library Record 1986).

26. *Id.* at 123.

tent, reviewed by concerned writers, there has been no specific commentary on the role and liability of network providers. This critical link between providers and the consumer appears to have been ignored so far.

C. Database Quality: A Conceptual Approach

This author, in a 1986 article, *Information Liability: New Interpretations for Electronic Publishing*, developed a framework for considering the concept of database quality and where responsibility rested.[27] This included a delineation of each organization's responsibility within the information chain. The author asked the following questions:

1. Who is responsible for what?
2. What are reasonable standards of accuracy?
3. What is technically feasible and what is economically feasible in adhering to these standards?
4. Is there legal remedy for failure to meet these standards?
5. Is it desirable or practical to have legal recourse?

To a limited extent, this writer attempted to answer those questions, suggesting that journalistic convention and legal precedent apply to an original author. He/she must take due care to gather accurate information and make a reasonable attempt to verify facts. Database producers should design a well-structured database and apply clear editorial policies to that database (including scope and coverage). Adequate documentation and user training, thorough data checking prior to publication, and a correction process for errors identified after publication are required.

Search services should update files regularly and properly, make corrections promptly, and provide user training and documentation for their customers. Telecommunications networks should consistently deliver complete information and provide service reliably during advertised time periods.

Users must take responsibility for the reasonable and proper use of information obtained online. The method of obtaining the data does not absolve a user from checking information for reasonability or appropriateness of use.

In her introduction to the eleventh National Online Meeting in 1990, Martha Williams reiterated these concerns. She particularly emphasized the user's responsibility for suitable source selection and the

27. Tarter, *Information Liability: New Interpretations for Electronic Publishing*, ONLINE, Sept. 1986, at 61.

interlocking vulnerabilities and responsibilities of the multilayered information chain.[28]

D. Database Quality: A Practical Approach

Ellen Fisher's empirical study of data-entry errors made during the preparation of a machine-readable bibliographic database focuses on the very practical aspects of quality control. She concludes that error rates may be reduced not only by careful selection and training of data-entry operators but also by careful preparation of the source documents and "increased use of software tests for error conditions" and "careful choice of terminals with correction capabilities matched accurately to system needs and details."[29] These recommendations, made in 1974, are frequently echoed by authors and practitioners many years later.

Frank Burgess contends that "to be useful, databases need to be comprehensive, accurate, up to date, and well structured."[30] This summarizes the contentions of most authors examining these issues.

The synopsis of literature written by Edward T. O'Neill and Diane Vizine-Goetz suggests that database quality control requires both manual and automated techniques, each complementing the other.[31] Useful manual approaches include user education, review, and user assistance. Describing data elements and formats and providing information about input standards and procedures, in conjunction with current, complete, and clear database documentation, may go a long way toward avoiding problems often identified as low-quality data.

Proofreading and "evaluative review" of data before it is entered into the database may eliminate many errors.[32] The final manual technique is users' assistance whereby users can report any errors discovered in the database. The authors also suggest allowing users to correct records themselves online. While this applies to certain cooperative databases such as OCLC (Online Computer Library Center), it is un-

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28. Williams, *Highlights of the Online Database Industry and Quality of Information and Data*, *in* National Online Meeting Proceedings— 1990, at 1 (Medford, NY: Learned Information, Inc. 1990).

29. E. Fisher, Sources and Nature of Errors in Transcribing Bibliographical Data into Machine-Readable Form, at v (A.M. thesis, University of Chicago, Graduate Library School, 1974).

30. Burgess, *The United Kingdom Experience of Viewdata*, *in* The Information Explosion: The New Electronic Media in Japan and Europe 16 (M. McLean ed.) (Westport, CT: Greenwood Press 1985).

31. O'Neill & Vizine-Goetz, *Quality Control in Online Databases*, *in* 23 Annual Review of Information Science and Technology 125 (M. Williams ed.) (Amsterdam: Elsevier Science Publishers, B.V. for the American Society of Information Science 1988).

32. *Id.* at 130.

likely, in this author's estimation, to be practical or desirable for commercial, non-cooperative databases.

The automated techniques discussed by O'Neill and Vizine-Goetz are more extensive and frankly more practical. Given the size and scope of online databases today, to rely exclusively on manual techniques would seem foolhardy. The authors suggest the use of self-checking data to "detect errors in numeric fields and other coded fields that would otherwise lack redundancy."[33]

A related technique is automated data validation, where admissible values for certain fields can be reviewed, and often corrected, automatically. For example, fields for years must include only four-character numeric data, or only certain publication names with specific spellings can be used in publication fields (this author's examples, not those of O'Neill and Vizine-Goetz).

Spelling and typographical errors, often due to data entry, scanning, or data transmission errors, can be identified and frequently corrected through the use of spell-checkers. The authors identify several methods of error detection and error reversal. They conclude that the current approaches consider only the "within words" redundancy and that future approaches probably will include a contextual or "between words" check for better results.

Authority control, a related quality issue, helps eliminate "spacing, punctuation, and capitalization inconsistencies, flags minor typographical errors, identifies erroneous abbreviations, ingestion errors, and incorrect qualifiers."[34] These checks may be online for correction at the data-entry point or batch processed for post-entry editing.

O'Neill and Vizine-Goetz point out that the problems created by duplicate records in a database "can reduce indexing performance, increase storage and maintenance costs, and impede effective searching."[35] To automatically identify these duplicates, various record-matching algorithms and/or unique identifiers such as the Universal Standard Bibliographic Code for merged databases can be used. There is still much room for improvement in this area.

Anne Mintz, in her November 1990 article, enumerates the main source of errors in databases, expanding on the issues identified by this author in the aforementioned 1986 paper. Mintz categorizes these problems as: document errors (from the original publication), editorial errors (generated during database creation), delays in database production (causing the database to be out of date), duplicate records (caused by the multiple entry of the same citation), typographical and other er-

33. *Id.* at 132.
34. *Id.* at 142.
35. *Id.* at 144.

rors in full-text articles, changes in editorial policy such as modifications in indexing terminology, numeric problems (transposition of characters or improper derivation of certain ratios), poor documentation, production errors (characterized by technological problems such as bad tapes being loaded into a file or delays in timely updates), and data record correction problems.[36]

Bill Kerrey, vice president of American Business Information (publishers of business directory information), attributes the quality of his company's databases to well-trained and motivated people who receive "cash bonuses for accuracy."[37]

Intermediaries elucidate the searcher's concerns about database quality. In an August 1989 article, Reva Basch enumerates "the seven deadly sins of full-text searching" and suggests ways to overcome them. These sins are:

1. Insufficiently documented differences between full text online and full text offline,
2. Lack of indexing in full-text files,
3. Search software inadequate for effectively searching full text,
4. Insufficient display options for full text,
5. Typographical errors,
6. Global searching of multiple files with a single query (improperly constructed by the searcher or poorly implemented by the database host), and
7. Difficulty locating the full text of a specific article (using full-text databases as document retrieval services).

Basch calls for database producers and distributors to improve documentation and enhance the power and flexibility of the underlying search and display software. She suggests a number of ways in which searchers could use advanced searching techniques to compensate for the shortcomings of current full-text database searching and retrieval.[38]

In a later paper, Basch focuses on the usability and limitations of various search systems for the precise retrieval of information—not content, but access to it. She categorizes the major challenges for retrieving useful information as:

1. Indexing (including changes in terminology and the overly restrictive use of qualifiers),
2. Authority files,

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36. Mintz, *Quality Control and the Zen of Database Production*, ONLINE, Nov. 1990, at 15.

37. *Quoted by* Kevin A. Siegel, *in Database Integrity: Never an Easy Process*, INFORMATION TIMES, Apr. 1990, at 10.

38. Basch, *The Seven Deadly Sins of Full-Text Searching*, DATABASE, Aug. 1989, at 15.

3. Field tags and field contents, and
4. Intersystem differences in the "same" database (including timeliness, retrospective coverage, and exclusions of certain sources).

Basch requests more intelligence in the search system to compensate for variant spellings, improved database structures and fewer editorial inconsistencies, online documentation stating currency and coverage of the databases, and, eventually, search systems that "resemble the way people actually think."[39]

Robert Berkman writes about data quality concerns that are not inherent to the online retrieval of information: accuracy of company directories, reliability of market research studies and forecasts, bias in surveys, and problems in the use of polls and surveys. However, he believes that creating online databases can add new problems, particularly because the researcher is further removed from the original information source. He recommends that information specialists evaluate the accuracy and reliability of the original information, not simply locate the information without assessing and communicating the limitations of the data to the end user.[40]

Other, less formal expressions of concern from users have included editorials and panel discussions at online industry conferences. These forums have restated questions about typographical errors, search system flexibility, timely updates, coverage, editorial policy, and the economic feasibility of implementing some of the requested changes.[41]

E. Critical Evaluation of the Literature

The literature is skewed toward the independent information professionals' point of view and their concerns for their own professional liability. Increasing attention is being paid to the practical aspects of quality control and delivery, but very little has been documented about actual programs in place or in development. While the paucity of such reports may reflect the proprietary nature of most quality assurance programs rather than their lack of existence, it hampers a thorough review of the systems actually in place.

A search of the literature indicates that a realistic assessment of the capabilities and economic realities of meeting some information pro-

39. Basch, *Database Reliability: The Black Box, in* NATIONAL ONLINE MEETING PROCEEDINGS—1990, at 31 (Medford, NJ: Learned Information, Inc., 1990).

40. Berkman, *Information Quality: An Emerging Issue, in* NATIONAL ONLINE MEETING PROCEEDINGS—1990, at 43 (Medford, NJ: Learned Information, Inc., 1990).

41. Quint, *Open Letter to the Online Industry*, DATABASE SEARCHER, Oct. 1990, at 4; Mintz, Tarter, DiMarino & Inkellis, Professional Liability—A Panel and Open Forum, Online '85 conference (New York, Nov. 4, 1985, taped); Quint, Christiani & others, General Session: Quality Watch Forum, Online/CD-Rom '90 conference (Nov. 7, 1990, taped).

fessionals' expectations has yet to be documented. The role of telecommunications networks has been almost completely ignored.

Legal analysis depends, primarily, on two cases (*Greenmoss* and *Jeppesen*) that do not deal with electronic information at all and on the theoretical application of tort, contract, and libel law. *Daniel v. Dow Jones* does not appear to have been widely considered by legal scholars, although the case precisely addresses the liability of database publishers and distributors for accurate information.

Jeppesen and *Daniel* examine the responsibility of the information provider to the user of the information, while *Greenmoss* deals with the information provider's duty to the subject of a report. In the first two cases, an information provider delivered the same information as another source, faithfully reproducing the content while changing the format. Yet the publisher Jeppesen was found strictly liable while Dow Jones was not liable because, held to the standard of a newspaper, actual malice was not proved. The seemingly inconsistent rulings of the two cases hinge on differing requirements for media and nonmedia defendants.

While it would be difficult to predict future court decisions based on these precedents, several things are clear. Jeppesen should have, at the very least, required a clear indemnity from the original source of its data (the Federal Aviation Agency). Jeppesen also should have included a strong disclaimer of fitness or accuracy with all of its charts. This might have provided some protection against the claims of the plaintiffs. And, an information provider has more protection the closer its data is to a traditional newspaper or other medial publication.

F. State of the Art

Information intermediaries, in an effort to raise the standards of their profession, are focusing on setting those standards. In addition, they are seeking to impose their standards upon database producers and distributors.

Legally, the game is one of prevention—to anticipate possible problems and contractually limit liability. By qualitatively improving the relationship between consumer and information provider (whether via an intermediary or directly between a search service and end user), companies can hope to reduce the risk of lawsuits.

Practically, little has been documented of actual programs for quality control. A significant aspect of this work will be to report efforts now in place to assure the highest quality of data economically available for public consumption.

III. METHODOLOGY

A. EXPLORATORY INTERVIEWS

To establish an appropriate methodology for exploring the question of information liability, the author has drawn upon the tenets of social science research. Because there is so little known (or, at least, so little documented) about information liability with respect to electronic information, the approach has been exploratory. Rather than begin with a specific hypothesis and seek to test it quantitatively, the author elected qualitative research: "the preferred methodology of scientists who wish to describe everyday life from the point of view of the actors. Since no objective laws are being sought, no hypotheses are stated."[42]

Why is this appropriate? Hubert Blalock puts it this way.

> Suppose a social scientists wishes to study something about which he knows practically nothing or about which there seem to be numerous misconceptions. Clearly the research must be highly exploratory. It cannot rely on specific hypotheses or a relatively small list of variables that are likely to be significant. The investigator must immerse himself in the data, learn all he can from as many perspectives as possible, and obtain very general information rather than data limited to a rather narrow focus.[43]

Unstructured, focused interviews differ from highly directive interviews. Structured interviews are standardized and are used primarily to verify existing theories and hypotheses. But exploratory, or focused, interviews are frequently used for "pilot inquiries into new problem areas where the purpose is the production of hypotheses rather than the verification of them."[44]

The author conducted a series of focused interviews, guided by an interview outline. The outline was based on an initial analysis of the situation through personal observation, preliminary interviews, and a review of the literature on the subject. While the interviewer attempted to cover each topic with every interviewee, the participant also determined the direction of the interview itself. This allowed for more in-depth discussion of topics the interviewees deemed significant and, at least as important, for the identification of other issues that had not been singled out in the initial development of the interview guide.

More specifically, the author conducted a series of elite interviews. Lewis Anthony Dexter, a political scientist and author of one of the de-

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42. D. DOOLEY, SOCIAL RESEARCH METHODS 281 (Englewood Cliffs, NJ: Prentice-Hall 1984).

43. H. BLALOCK, AN INTRODUCTION TO SOCIAL RESEARCH 41 (Englewood Cliffs, NJ: Prentice-Hall 1970).

44. Dean, Eichorn & Dean, *Observation and Interviewing, in* AN INTRODUCTION TO SOCIAL RESEARCH 274 (2d ed., Doby ed.) (New York: Appleton-Century-Crofts 1967).

finitive texts on interviewing methodology, clearly defines elite interviewing (which he prefers over "exploratory" interviewing).

> It is an interview with any interviewee—and stress should be placed on the word "any"—who in terms of the current purposes of the interviewer is given special, nonstandardized treatment. By special, nonstandardized treatment I mean
>
> 1. stressing the interviewee's definition of the situation,
> 2. encouraging the interviewee to structure the account of the situation,
> 3. letting the interviewee introduce to a considerable extent . . . his notions of what he regards as relevant, instead of relying upon the investigator's notions of relevance. . . .
>
> In elite interviewing, as here defined, however, the investigator is willing, and often eager to let the interviewee teach him what the problem, the question, the situation, is—to the limits, of course, of the interviewer's ability to perceive relationships to his basic problems, whatever these may be.[45]

As the respondents in this study were professionals specifically sought for their expertise, the techniques of elite interviewing were applied throughout the research. George Moyser's description of elite individuals undoubtedly applied to the interviewees in this study. "They have complex and sophisticated outlooks worthy of detailed and individualized exposition; they have unique experiences and vantage-points; not least, they have expertise that the researcher may wish to tap."[46]

1. *Advantages of Exploratory Interviews*

Unstructured interviews have several advantages. According to Gideon Sjoberg and Roger Nutt, they allow the interviewer to be sensitive to the participant's cues and to turn them into meaningful questions, to emphasize the participant's worldview, and to use the interviewee's categories rather than the interviewer's to establish classes.[47] As the objective of this research is to look for common information liability concerns and identify possible ways to alleviate those concerns, this approach was used to gather enough observations to begin establishing categories of concerns and solutions, particularly with respect to problems and methods of quality control.

One of the significant benefits of the unstructured interview is that the interviewees talk about their interests, not just about what the re-

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45. L. DEXTER, ELITE AND SPECIALIZED INTERVIEWING 5 (Evanston, IL: Northwestern Univ. Press 1970).

46. Moyser, *Non-Standardized Interviewing in Elite Research*, *in* 1 STUDIES IN QUALITATIVE METHODOLOGY 116, (R. Burgess ed.) (Greenwich, CT: JAI Press 1988).

47. G. SJOBERG & R. NUTT, A METHODOLOGY FOR SOCIAL RESEARCH (New York: Harper & Row 1968). See particularly the chapter "Indirect Observation."

searcher thinks is significant. Since a primary objective of this study was to identify areas of concern, letting the respondents in the study present their concerns, rather than merely react to certain areas presupposed as important, generated a greater number of categories for exploration.

2. *Limitations of the Methodology*

Unstructured interviews do not lend themselves to statistical treatment. Therefore, the researcher must "depend on a more impressionistic interpretation of the data for arriving at conclusions."[48]

Unstructured methods may be more prone to bias. Because interviews are based upon relationships established between the interviewer and respondent, a stronger relationship with certain types of people may result in an undue amount of information from persons biased toward a single point of view.[49] As a result of this concern about bias, the author posits that the findings of this study do not represent the consensus of a population but rather indicate issues considered by several segments of the online industry.

When reviewing research methodology, social scientists consider the reliability and validity of the study.

> "Reliability" refers to the probability that the repetition of the same procedures, either by the same researcher or by another investigator, will produce the same results. "Validity" refers to the accuracy of a given technique, that is, the extent to which the results conform to the characteristics of the phenomena in question.[50]

There *are* problems with reliability and validity when using unstructured interviews. Interviews are a social process between two humans that cannot be exactly replicated. The effects of interpersonal interaction cannot be removed from the results of the interview, so no two researchers are likely to obtain exactly the same information.[51] Validating results is equally problematic because intuition and interpretation play a major role in the analysis. "What little research there is indicates that on the whole there is a low level of comparability for qualitative research."[52]

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48. Dean, Eichorn & Dean, *supra* note 44, at 275.

49. *Id.* at 276.

50. C. BRIGGS, LEARNING HOW TO ASK: A SOCIOLINGUISTIC APPRAISAL OF THE ROLE OF THE INTERVIEW IN SOCIAL SCIENCE RESEARCH 23 (Cambridge: Cambridge Univ. Press 1986).

51. Jones, *Depth Interviewing, in* APPLIED QUALITATIVE RESEARCH 48 (R. Walker, ed.) (Aldershot, Hampshire: Gower Publishing Co. 1985).

52. Mostyn, *The Content Analysis of Qualitative Research Data: A Dynamic Approach, in* THE RESEARCH INTERVIEW: USES AND APPROACHES (M. Brenner, J. Brown & D. Canter, eds.) (London: Academic Press 1985).

Given the objectives of this study, problems with reliability and validity do not negate the appropriateness of unstructured interviews as a research technique. With insufficient information to generate initial hypotheses, no quantitative method could be used.

Other qualitative research techniques were less appropriate. Gathering potential respondents in a single place for focus groups was impractical. Furthermore, it is doubtful that the same amount of depth or frankness could have been achieved in a group discussion.

Opportunities for direct or indirect observation were limited. McCall and Simmons argue that participant observation is best used in "one particular research context—the study of the dynamics of a social organization or situation."[53] A review of such dynamics was not the purpose of this study.

Interviews seemed the correct choice for exploring the issue of information liability because the problem, while acknowledged as an issue, was poorly defined by the legal community and the information industry. To generate a specific hypothesis and test it in this area would have been premature. Interviewing persons most likely to be concerned about information liability and quality control was the most appropriate way to obtain sufficient information about this ill-defined question.

B. SAMPLE SELECTION

The author selected potential participants first by identifying five to ten candidates from each relevant link in the information chain. These people were identified from the literature, industry publications, and conference rosters, and by referral. In a sense, the sample selection was initially a quota sample, in which representatives from different groups were sought. However, because there was no narrow criteria for participation and the universe of possible participants is limited, the sample may be partially described as a "snowball" sample, where one informant leads to another.[54] The referral of one interviewee to the next was significant in obtaining the cooperation of many participants in the study.

For each of the links in the information chain under examination the author attempted to interview a person who could speak to the legal, marketing, product development, and/or quality assurance perspectives. This was not possible in every case.

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53. ISSUES IN PARTICIPANT OBSERVATION: A TEXT AND READER 341 (G. McCall & J. Simmons, eds.) (Menlo Park, CA: Addison-Wesley 1969).

54. Coleman, *Relational Analysis: The Study of Social Organizations with Survey Methods*, HUMAN ORGANIZATION 17 (4), at 28, *quoted in* McCall & Simmons, *supra* note 53, at 64-65.

Because this sample was not statistically significant, there is no concern about issues of self-selection bias or nonresponse. Most people invited to participate did so. Only one person refused outright a request for an interview; several others were willing to be interviewed, but an acceptable time for the discussion could not be scheduled. Every interviewee spoke longer than the hour initially allotted for the conversation. Both telephone and face-to-face interviews were conducted—and there seemed to be no difference in the willingness of interviewees to speak forthrightly. The author believes that the academic nature of the study also contributed to the high level of cooperation received.

In all, twenty-one respondents were interviewed, including representatives of database producers, database distributors, intermediaries, telecommunication providers, and end users. See Appendix A for a complete list of interviews conducted.

C. Content Analysis

The author also relied upon printed material (marketing, training, documentation) for supporting evidence of database producers', database distributors', and telecommunications providers' methods of addressing this issue. Whenever possible, the author reviewed contracts, terms and conditions, responses to requests for proposals, or similar documents to evaluate the action taken in the legal arena to set expectations and/or limit liability. Much of this material is publicly available while some of it was provided by interviewees.

D. Attribution of Sources

Although the individual respondents spoke freely and at length during the interviews, a number of them were reluctant to be quoted directly. Their reasons varied. Some believed, given the competitive nature of the online industry, that owning up to certain problems or concerns might open their companies to criticize and competitive disadvantage. Others did not want certain information about their private company made public. In certain instances, direct quotations would require formal corporate review and approval. Some interviewees expressed personal opinions as professionals in the industry and did not want those opinions to be perceived as the official positions of their employers.

In order to respect the desires of some respondents for generic attribution, the section that follows speaks in terms of links in the information chain but does not identify specific individuals or companies (unless the information was otherwise publicly available). Because this article seeks to identify concerns among each link, this method of reporting is not believed to compromises the results of the study.

IV. RESEARCH RESULTS AND ANALYSIS

The very success of online searching has created new standards of accuracy and quality. In the early days of the online business, the marketing fraternity spent an enormous amount of time and energy trying to convince prospects that online searching was a viable adjunct to manual research. Online searching was positioned as a supplement to traditional print research methods.

Over time, computer-assisted information retrieval has actually replaced manual research for some users. A number of law firms no longer maintain extensive libraries of books and looseleaf services, finding that their research needs are adequately served by LEXIS and Westlaw. In other instances, the roles of online and manual searching have simply been reversed. Researchers rely first on online searching and secondarily on printed materials for information.

This new reliance on online searching as the primary, even the sole, source of research material for some information seekers speaks well of promises made and promises fulfilled in the past. It also poses new challenges for both the information seeker and the online industry striving to meet the searcher's needs.

Respondents were predominantly concerned about marketplace liability, that is, the ability of the organization they represent to compete effectively and profitably for consumer dollars. They recognize the need to provide a high-quality, useful database service that meets both customer needs and customer expectations. This concern dominates the more theoretical concerns about legal liability, although those issues are by no means ignored. However, the bottom-line need to compete in order to survive and profit dictates a focus on striving for an excellent product, with only a secondary focus on the strict legal limits of liability.

The general agreement is that a good product will satisfy customers. Satisfied customers will be less likely to sue for unsatisfactory results. Nevertheless, all respondents recognize the general risk of lawsuits. They strive to put processes and procedures into place that will demonstrate their organization's good faith and professional execution of its responsibilities in order to minimize damages should a lawsuit be brought. The consensus is that lawsuits cannot be prevented, but with careful planning and implementation the likelihood of being found liable can be reduced.

Most respondents, whether they represented database producers, distributors, networks, or intermediaries, said that their (and others') online services had improved significantly over the last ten to twelve years. This seems to correspond with the maturing of the industry, the development of viable electronic information businesses, significant

changes in the technology of electronic information delivery, and rising consumer expectations.

One respondent characterized this overall improvement as a function of the "evolution of quality." What the online information industry and its consumers thought was acceptable quality ten years ago has changed significantly in the interim. Ten years ago there were fewer databases, smaller information needs, and less comprehension of what online information could do for the researcher. Therefore, the consumer was willing to put up with restricted access and poorer-quality data. Online delivery was such a radical change in the art of information retrieval that users were delighted with the powers of online searching—powers that are now recognized as limited.

With hindsight, one might ask why developers and consumers did not anticipate the need for more precision in targeting information, for spelling out abbreviations, for searching on smaller and smaller units of information, or for any of the other ways of accessing information that now seem de rigueur. That the online community now recognizes many of these needs points out the evolution of the technology and changing standards. Many of the quality issues addressed today are a result of decisions made in the earlier stages of electronic information retrieval. At the time the decisions were made they may have been the best ones or even the only ones possible. Like all services that rely heavily upon technology, as capabilities change so do the expectations of the users.

The responsibilities of search services vary significantly from those of database producers. Some services, such as Westlaw and Mead Data Central, actually produce data as well as distribute it, and, as a consequence, have all the same problems as database producers. However, research services face an even greater exposure to information liability because of the greater number of variables involved and the greater extent of the data distributed. For example, Mead Data Central, a representative search service, hosts over fifty-seven legal libraries and four hundred nonlegal databases,[55] accessible by 230,355 active users[56] almost twenty-four hours a day. A majority of these databases are updated daily or weekly, with a lesser number updated monthly or quarterly.

This chapter summarizes a number of categories that the respondents in this study identified as areas of concern with respect to information liability and online database quality. This author does not

55. *LEXIS/NEXIS Library Contents and Alphabetical List* (Winter 1989/90 ed.) (Dayton, OH: Mead Data Central 1989). A single legal library, CODES, contain ninety-three different files.

56. *Mead Hit 30% Growth Projected for 1989*, INFORMATION INDUSTRY BULL., Mar 22, 1990, at 4 (Stamford, CT: Digital Information Group).

believe that this is an exhaustive list, but it is indicative of common issues faced by the online industry.

The concerns are legitimate, the risks difficult to calculate, and the likelihood of lawsuits or loss of reputation unknown. The single strongest point of consensus among the respondents was that it was better to be safe than sorry. In other words, while no one could quantify the size of the risk or the odds of being sued, the possibility of financial loss due to claims of poor-quality data or failure to adequately meet the customer's expectations for an online service was too great to ignore. If information liability is a mirage, it is nevertheless treated as if it were real.

A. Database Publishers and Editorial Policy

Database producers indexing, abstracting, or providing the full text of original material have, it seems, two types of responsibility: to create a well-designed database, and to apply clear editorial policies to that database creation. That the information be as accurate as possible is implicit (see below for further discussion).

A well-designed database calls for a logical display and relationship of the data elements. Significant segments of information must be retrievable and preferably searchable (in order to increase the chance of retrieval). Problems arise when the structure of the search system and the data being fit into the search system's database structure are not well matched. As more types of information are stored electronically, search systems must be able to take advantage of the data. The database publisher, ultimately, must be responsible for a good fit between the information in the database and the search system hosting the database.

The scope and coverage of the database must be clearly defined. If a database claims to index only articles published between 1959 and 1976, it can hardly be faulted for lack of comprehensiveness, for it was never touted as comprehensive at all. Nor should a newspaper index be expected to contain material from journals or magazines.

Clear definition of scope and coverage is particularly critical in the areas of law and medicine. For example, when conducting a search for all cases on point, knowing that the database contains only twenty years of Massachusetts law might lead one to further manual research on the earlier years of Massachusetts law. Without such knowledge, one might conclude that an exhaustive search had been completed and thereby lose a case based on incomplete information.

In turn, a physician researching the effects of a particular drug would need to know whether or not a database covered drug contraindications to see if certain combinations of drugs would be desirable or

dangerous. A given database might not provide all the data desired, which could result in a fatal misuse of information. While a database producer cannot correct the bad habits of an inexperienced or careless searcher, the producer must provide adequate information about the contents of any given database. The database distributor must, in turn, be sure that content description is easily and widely available to search service users, because the distributor is usually the primary contact for the searcher.

While, in certain instances, it may be difficult to convey the nuances of publication coverage, it may also be quite important. Predicasts, for example, provides "selected" full text of articles. The difference between the "complete articles of short length" and "the excerpt approach for lengthy articles"[57] is important for many searchers, who may want to review the entire article, not just an excerpt. Similarly, knowing that not every article in a publication is indexed may cause a searcher to look elsewhere for information or to augment the search with other sources. Often, a database describes coverage as "comprehensive," subtly different from "complete." Misunderstanding the difference can lead to user confusion and unmet expectations.

Another issue is that of databases that are available through different distributors. Sometimes the content of a database that superficially appears to be the same actually differs from host to host. For example, Magazine ASAP on Dialog is different from Magazine ASAP II on BRS. To the uninitiated, the similar names would lead one to believe that the databases contain the same information. In fact, the distinction between the two is not just in the name but in the publications included in each database. While there are contractual reasons for these differences, a casual searcher may assume that the content is the same on each service and be sorely disappointed as a result. In another example, a user cited an instance where coverage of the California Code of Regulations differed on each of three search services. This inconsistency can result in confusing, even misleading, search results.

B. ACCURACY

In order to provide data that is as accurate as possible, the online industry utilizes both human control and automated checks. Database publishers, distributors, and network providers use a wide array of programmatic tools to ensure accuracy, augmented by people administering these programs—and ensuring that everything works as it is supposed to.

57. 9 *PTS Online News*, Dec. 1990, at 1 (Cleveland, OH: Predicasts).

One respondent characterized this aspect of database quality as technical, comparable to quality control in manufacturing. Is the content of the database what was intended to be in the database? Does the search program run the way it was programmed to run? Can one retrieve from this database the information parcels that were designed to be retrievable?

C. Training Editorial Staff

The human element requires thorough training of indexers and abstractors. Some firms require that indexers possess a Master of Library Science degree, while others rely on their own in-house training program. Clear procedures and standards are critical; they must be defined and consistently applied. The database producers interviewed for this study agree that consistently training indexers and abstractors well leads to a better editorial product. Editorial standards and policies are unique to each database, but the application of those policies and standards needs to be uniform within the database. The bibliographic record produced by indexer A should look much the same as if the same article were indexed by indexer B.

To achieve this uniformity, training and indexing tools are critical. Some database publishers have extensive in-house training programs: one firm requires that all editorial staff, regardless of their background and pervious experience, pass through a three-month training course. Indexers and abstractors are then assigned to a specialized work group and given additional training for the subject area and/or specialized publications for which they will be responsible. For other publishers, training is less structured; most of it is on-the-job with heavy feedback provided by editors, who fill a role similar to an editor for a traditional print publisher.

An indexer indexes a periodical, creating a bibliographic record that includes some sort of subject headings and sufficient information for an article to be located and the full text read, if relevant. Editors review the results and correct them as necessary. Sometimes editors only sample records; sometimes they review 100% of the records produced. Initial training is reinforced and refreshed in a number of ways. One database publisher distributes daily editorial reminders on popular topics with "suggested headings" for stories frequently in the news.

D. Editorial Accuracy

Several database producers expressed concern about abstractors correctly summarizing an article. An abstractor could miss the primary thrust of the article; the abstract might cover all the salient points but place emphasis on the less important areas or, worse, entirely miss the

point of the article abstracted. To guard against this problem abstractors are trained rigorously and editors closely review abstracted material.

The abstracting and categorizing of product reviews, a related issue, concerned one respondent. In some databases, reviews of products or services (such as personal computer software, books, or restaurants) include the assignment of an alphabetic rating (A = excellent, B = good, etc.). Certain database distributors allow only a single rating per record because the field is a single character long. If a review contains comparisons or discussions of many products, some of which are judged to be excellent, others of which are judged to be poor or average, a single averaged rating is misleading. Microcomputer Index solved this problem by creating several records for a single article, listing each product reviewed so that it could be rated separately.

On the other hand, sometimes the review itself contains both strong positive and strong negative statements about the product. A C rating might be assigned. In this case, rather than an average rating, C would indicate both pluses and minuses.

The concern about product reviews springs from both the end user's perspective and that of the manufacturer/owner of the product or service reviewed. A searcher seeks the most exhaustive, accurate information about the product. The index or abstract must communicate what the reviewer, in the original article, believed. However, the manufacturer might dispute the findings of the original reviewer, and the database producer is at risk for promulgating statements that the service is bad or indifferent. (It is unlikely that anyone will complain of an excellent rating, even if unwarranted!)

The product manufacturer might claim that (1) the review was misinterpreted, (2) the abstract was correct but the rating was not (possibly a typographical error, possibly a different interpretation of the variations between A and B rating), or (3) a poor grade/rating might restrict interest in a product, a particularly knotty problem if multiple reviewers gave the product different ratings from good to bad.

The database publisher interviewed thought that the first point, misinterpretation of the review, could be defended as an opinion about the contents of article. The second issue, a correct abstract but an incorrect and mismatched rating, could be dealt with in the general effort to ensure accuracy. The third instance, in which the product manufacturer disagrees with the general representation of the product because different reviewers rated the product differently, did not seem to be addressable. The nature of online searching dictates that only the question asked is the question answered. If the search restricts the question to finding all F-rated restaurants (to avoid them), even though the

database might include five abstracts of reviews rating the same restaurant an A, that breadth of opinion about the restaurant will not be revealed. This is not a problem unique to online searching. It is, however, exacerbated by the specificity of online queries.

E. DIRTY DATA

Typographical errors are visible mistakes, often called "dirty data." Because typographical mistakes are so readily apparent they cast doubt on the overall quality of the database. Each link in the information chain interviewed focused on different ways to prevent and correct those problems.

Database producers minimize typographical errors in bibliographic records by creating hosts of approved terms for specific fields, then limiting input to those approved terms. Not only does this minimize typographical errors but it is believed to contribute to consistent indexing. For example, in a date field, for a monthly publication, only the twelve months of the year could be input. Other entries or misspelled entries would be flagged as errors. In some cases, this error detection was online and indexers received immediate feedback for correction. In other cases, the records were reviewed during a batch process and then flagged for correction.

Full-text data is created by three primary means: it is converted from a printed version through keying or via optical scanning, or it comes to the database producer in machine-readable form. Errors in hard-copy conversion arise from the data-entry mistakes of humans while errors in optically scanned text are more often due to the failure of the technology.

To reduce data-entry errors, database producers contract for a certain level of accuracy from their data-conversion suppliers. Often over 99 percent, this measure of accuracy refers to the percentage of correct characters out of total characters in the file, not the percentage of correct words. So, in an article of two hundred words of seven letters each, 99 percent accuracy could still yield fourteen errors. At 99.9 percent accuracy the article might contain 1.4 incorrect characters. While a 99 percent or 99.9 percent accuracy rate may be impressive statistically, the actual visual effect of one to fourteen errors in a single article could be dismal.

Respondents stated that database publishers check this accuracy via a sampling method, reviewing carefully some subset of the total text converted. If a supplier delivers a higher error rate than acceptable, the database producer will work closely with that supplier to improve the quality of the converted information.

Optically scanned data is subject to a similar sampling review process using spell-checkers. Among those interviewed for this study, optical scanning appears to be conducted internally, so there are no contractual standards by which to measure performance. One database producer dealt with the limitations of the technology by scanning the same document multiple times, reconciling differences, then having a technician review and correct the remaining errors in the text after it was subject to a spell-checker.

Spell-checkers, software programs that review each word in a given text and check against a dictionary of acceptable words, are often used to verify the correct entry of terms. These are more frequently used in full-text and abstract records, where a controlled vocabulary does not apply.

While significantly reducing the occurrence of typographical errors, spell-checkers are imperfect. Words that are correctly spelled, but not in the dictionary, may be identified as erroneous. Combinations of characters that correctly spell real words, but not the right word, cannot be singled out for correction. For example, the word "modem" may be easily substituted for "modem" and only identified as incorrect by a reader who discerns the mistake by virtue of the context.

Unfortunately, due to the volume of full text processed and integrated into databases, not every single word or article can be checked. The problem is not the spell-checker itself but the cost of resolving the errors. Many flagged errors are not truly mistakes but personal names, geographic names, seldom-used words, or words from a specialized vocabulary. A real person must resolve the inconsistencies. The benefit must be weighed against the cost.

Machine-readable full text received by the database publisher directly from the original publication is not subjected to content review. Most frequently machine-readable text is on magnetic tape, although it may be transmitted electronically or delivered on diskette or magnetic card. The recipient assumes that the original publisher has subjected the media and the data it carries to all the necessary spell-checkers and quality-control tests. Presuming that the digital data is readable, there is no further evaluation for spelling per se.

This does not guarantee that the data is perfect. It merely places the burden of clean data upon the original information provider. At times, this reliance may prove problematic. For example, many magazine publishers deliver the full text of an issue on a version of their typesetting tape. Normally, all the typesetting codes have been stripped out so the database publisher receives pure text with agreed-upon codes for the database publisher (indicating the beginning and end of an article, for example). Upon occasion, the typesetting codes are not removed

completely. This might end up looking like a typographical error online when a stray typesetting code appears in the middle of the text. This is a rare, but not unheard of, occurrence.

Several respondents thought that the importance of typographical errors was overstated. In full-text databases, key words are usually repeated several times so one or two misspellings of an important term are unlikely to affect retrieval of the article. The cost of providing 100 percent accuracy is prohibitive; the cost/benefit tradeoff simply does not make sense here.

In a bibliographic database, however, the correct spelling of key words such as subject headings, journal titles, and authors' names—all terms that are likely to be part of a search query—is critical or the article reference will not be retrieved. A system looks for exactly what one tells it to look for—and will not find a record that spells a searchable word differently than the searcher has specified.[58]

F. DATA UPDATES

Once a database producer has completed a database update, the search services usually load the data on an agreed-upon schedule that is often contractually determined between the distributor and the publisher. Database publishers and distributors view timely updates as providing a competitive advantage, particularly for data that may be distributed by a number of vendors.

Failure to meet these often-advertised update schedules may cause user dissatisfaction but could rarely be sufficient basis for a successful liability claim. The exception to this might be the failure to update a daily database upon which users rely for very current information. For a legal database, failure to immediately load an important court decision could make the difference between a user winning or losing a case. If a decision has been overturned or a new interpretation of an important point of law handed down, timely availability of the information may be critical. This seems a more likely source of problems than the failure to load a less frequently updated file on time.

On the other hand, failure to load data properly could be a basis for a legal claim. Many things could go wrong. An update could be incomplete or the search service might drop data in the process of loading through either machine error or human mistakes. Entire records could be omitted or parts of records lost. The data could be garbled, tapes im-

58. There are certain exceptions to this rule. Some search services search for both the singular and plural of a word, even though only one version may be specified. Also, Mead Data Central accommodates simultaneous searching of American and British spellings of certain words (e.g., color, colour) without requiring that the two different spellings be specified.

perfect, or disk drives dirty. An incompetent messenger service could run a magnet across the tapes and render them unreadable. As a result, searchers may retrieve nonsensical information or records missing critical data elements.

Because of these, and other, possible problems, database distributors take great care in developing processes and procedures to minimize or (they hope) eliminate the introduction of error into data received from the database producer without deleting any data received. Database distributors generally expect the data they receive to be of a standard high enough to meet contractual obligations. Clearly, it is in the publisher's best interest to provide high-quality information.

One distributor checks each set of data according to the individual specifications for that database. Technicians verify, either via computer programs or manually, that the format is correct, that all the data is readable and manipulable, that all segments or portions of the database expected are present, that the time frame expected is provided (one day if a daily update, for example), and that identifiers and copyright information are present. Checks for all databases are equally extensive, but each database has different requirements because there is no single standard among database publishers.

Database services commonly assign specific persons to specific databases so that they become familiar with the database itself and with format problems that may frequently occur, and so that they can develop a relationship with people at the database publisher. (At one database distributor there are two backup staff members for each assigned database contact.) In this fashion, recurring problems come to be easily diagnosed and solved. The person responsible for the database at the distributor can estimate time needed to solve the problem and more realistically adjust schedules based on previous experience with similar problems.

As database services provide more and more information on a more frequent timetable, scheduling of updates becomes a significant issue. Customer expectations for timely updates must be met. For widely searched databases, a delayed update might result in the display of a notice online announcing the delay. For those databases that are updated irregularly, and so noted, such an announcement might be unnecessary.

The communication between database publisher and distributor is one of the weakest spots for quality assurance. If the contract between the two parties requires specific timing of updates, formats of data, and notice for changes in either formats or procedures, then required communications on these subjects is likely to be fairly clear. If these issues are not specifically and formally addressed, miscommunications happen more frequently. It is not out of the ordinary for a minor and unher-

alded change by a publisher's programmer to cause a major, albeit unintentional, problems. In instances where the database production is merely an adjunct to the publisher's primary business, these problems are more likely to occur.

G. Error Correction

In spite of every effort to create and load an error-free database, mistakes do occur. An error may be detected by a whole host of people: customers, original publishers routinely reviewing their publication online or informed of a problem in their original publication, quality assurance staff at the database publisher or distributor, or even a competitor setting up a demonstration.

Once the error has been discovered, database distributors have a number of ways to correct it. The method and the speed of correction may depend upon the risk posed by leaving the error online. In an emergency (e.g., a question of libel or danger to health), the process is designed to be very speedy. If the mistake is less significant, the correction process often takes longer and is handled as part of a routine update.

The permission of the copyright holder (either the database publisher or the original publisher) usually is required to make a change. At least one search service has the capability to identify a record, pull it up on a screen, reenter the data or correct the erroneous information, delete the bad record, and replace it with the corrected record real-time. More commonly, the record is simply replaced with a corrected record in the next regular update. The inverted index, the key to retrieving information, must be reprocessed in order to correctly retrieve the new record.

In the past, at least one search service has had problems with the improper reparsing of a record for inclusion in the inverted index. Because the index pointed to a suppressed record but the record number (a unique identifier) was connected to the newly corrected record, a query could be answered with a record that had no apparent connection to the question. This problem appears to have been corrected.

In some instances, an error correction may be appended to the original record so that whenever the original record is retrieved the correction or amendment is also retrieved. This is usually the original publisher's decision. For instance, if an article with a misstatement appears in a newspaper, corrections and amplifications often appear in a subsequent issue. To maintain the archival integrity of the online file, the original article is not changed (because it appeared originally with a mistake in it), but the correction is attached to the online record so that a searcher would be certain to know that the article had been corrected.

Other databases, such as Chemical Abstracts, retrieve and display corrected records automatically when a searcher conducts a stored search. On Dialog, that procedure is the default; to *not* see the corrections one must command their suppression. Given the nature of the database, Chemical Abstracts believes that displaying corrections is very important to its users and does not want those corrections to be inadvertently missed.

When the original publication contains an error but does not or cannot correct it, the database publisher and distributor face an interesting dilemma. If the online database purports to be the same as the original print source, then the database may deal with this in two ways. It can leave the record as is, with the error intact, or it can annotate the record with the original data and the corrected data. Both methods of dealing with this issue are used today. This author believes that the latter approach protects more effectively against information liability claims. However, the former approach is easier and places the burden for error correction on the original publisher.

In various industry forums and publications, end users have suggested that errors detected and corrected should be published regularly in some fashion. The suggestions vary. They include: regular mailings of corrections to anyone who has searched a particular database within a specific time period; required displays of corrections online as a prelude to a search; a separate database or location within the search system so corrections could be perused at will; and combinations of online/print displays. Participants in this study raised several questions about the practical implementation of these suggestions.

Should all corrections or only substantive corrections be identified and communicated? What distinguishes a minor correction (typographical error) from a substantive correction (the name of the principal speaker was wrong)? Who determines the distinction?

If one provides all corrections to users, what purpose is served? Can these corrections be effectively evaluated by the users? If corrections are sent in hard copy to users, who pays the cost of the publication and distribution? How does a search service determine who should receive these corrections? Should it be the database searchers who searched a particular database or only those who retrieved the erroneous record? Identifying and maintaining records of searches and connecting them to specific subscribers raises some interesting privacy issues.

If the corrections are displayed online, who pays the cost? Is the search for corrections free to the user? Does the search service require it before a new search can be entered?

What can be done about the searcher whose single online search uncovered an erroneous piece of information and who never logs on again? How does one issue a correction to that person?

Because of the questions raised above, most of the suggestions for notifying searchers of corrected records do not seem to be practical at this time. Cost is a significant question. Until some entity is willing to bear or share the burden, the more all-encompassing suggestions are unlikely to be implemented. In the meantime, let the user beware. Once again it should be noted that this is not a problem unique to online searching. Errors in print are not sent to the attention of all previous readers. The tendency to hold online sources to a higher standard may be due to the theoretical possibility of identifying specific people retrieving specific pieces of information and linking them to a notification-of-errors process. It is not currently a practical alternative and so has not been implemented.

H. Search System Usability

Another way of looking at quality is from the standpoint of usability. This point of view suggests that a good search service not only contains accurate information but is easy to use. More than one respondent stated that a database distributor should constantly seek to improve the search system itself by asking, What does the user want? How can the process be simplified and made more obvious to the user?

These respondents contended that users cannot remember all the details of all the databases of interest on each of the search services available. An important part of delivering a quality product is to make the search and retrieval task easier for the user. What good is a sophisticated, precise search technique if no one knows about it or remembers how to use it? To that end, search services' efforts include several categories: standardization of data formats, cross-file searching, duplicate detection, and front-end menus. These areas will be discussed briefly in the following section.

I. Standardization

Database publishers producing multiple databases often develop a single format for all their databases. This not only provides a consistent database design that reduces the necessary learning time for the searcher, it also allows for efficiencies in the production of the databases. (One quality-control program can be applied to all the similarly designed databases.) Once a database is designed it is rarely changed. The expense of reformatting a backfile is enormous. It may not even be possible to retrofit existing data if a new design calls for dividing large parcels of information into smaller parcels. That cannot

be done with any easy automated process at this time. Manually reviewing and changing the data would be prohibitively expensive if the database were of any substantial size.

However, database distributors face the real challenge of standardization. The producer has one goal—to bring its data into view for the user in lieu of a competitive database. The database distributor has a larger goal—to bring all databases into view for the user with equal ease. Taking hundreds of disparate database formats and making them equally accessible, without losing access to information or distorting the scope of the database, is a significant task.

The current trend toward meeting this challenge is that of standardization, at least to the eyes of the searcher. But several questions need to be answered in order to design an effective standardized-access system. Are there groups of databases that should be accessible in the same way? How does one make them look alike in the retrieval process? What pieces of information should be searchable and what pieces displayable only? For example, searching by an author's name is a common requirement, but most people do not search by the page number range (e.g., pages 21-26) for an article. Nevertheless, the page range is essential to retrieving an article form its original printed source, so it should be displayable.

Should some fields be separately searchable but displayed as part of a whole with other data? One might search a company report database by percentage change in annual revenue, but the record might display the revenue change as well as the absolute value of the revenue and other related financial data. A data element might be double-coded to be both searchable and displayable for maximum flexibility.

Several search services now offer the capability of searching several files with a single command. This reduces the need to ask the same question in multiple databases but makes it imperative that the files be able to process the search query and produce a meaningful result. So, if the parameters include an author's name and a range for the date of publication, all the databases included in this group search need to be searchable by author's name and date range. If one wants to search the statutes of all fifty states with a single command, the statutes need to be formatted similarly. Understanding the limitations of the cross-file search is important if users are to be satisfied with the results.

Duplicate detection on Dialog grew out of complaints from users about the host of citations displayed for the same article when a cross-file search drew references to the same article from different databases. While a search service can standardize searches and data display to a certain extent, it cannot find or display data that does not exist, nor can it match the records that cite the same article in widely variant ways.

The successful efforts of database distributors to standardize are tied closely to database publishers' database design and editorial policy implementation.

Menu-driven systems and "front ends" are another way of simplifying the search process. Menus present choices for the searcher that narrow the search down by asking for a more and more precise selection of information. This compares to the normal command language that a searcher might use, in which the query is structured with greater or lesser precision by the searcher, unaided by the search system's defined menu. Front ends are variations of menus in that they ask questions of the searcher. The searcher's responses are then translated by the front end into the appropriate query language and the information is retrieved. The terms "front end" and "menu" are often used interchangeably, but they connote a slightly different approach to simplifying a command structure.

Menus and front ends make online searching more accessible to the nonspecialist. They tend to blunt the power of the search system, however, because only the most common choices can be incorporated into limited selections. Does this pose a problem from the standpoint of information liability? It is possible that failure to retrieve information that does exist within the database but was not found because of the imprecise nature of the menu structure could be the basis of a liability claim. The argument is weak, though, because the user always has the choice of using the more complex and precise command language available.

J. MARKETING

The marketing arm of the online industry (here used to include both sales and marketing functions) has contributed both to the success of the online business and to the creation of expectations among prospective and current customers. At the onset of the online era, marketing first had to communicate the benefits of online searching as a research method and only secondarily convince the researcher that a particular search service or database was the one best suited to answer the inquirer's questions.

Online information retrieval is now a credible research method so that marketing efforts focus primarily on the positioning of a search service or database against its online competition. Several respondents stated that another important part of marketing's role now is to get users to understand that there are risks to using the data available. It is neither infallible nor all-encompassing. The earlier sales pitch may have been too effective because many users are unaware of the limitations of online searching.

In touting the virtues of a search service or database, the marketing function must be careful to establish realistic expectations. This is a basic tenet of sales and marketing—do not overpromise. However, electronic information retrieval poses a particular challenge. Because the entire concept is relatively new and still not universally known, customer experience and expectations vary widely. Unlike toothpaste, where most people know what it is and what it is supposed to do, and the significant differences of taste, color, and form of dispenser are evident, online searching has not been in existence long enough nor is it uniform enough to have established a set of consistent expectations or standards.

Marketing plays a key role in setting these expectations. The differences between search services and databases are many— sometimes radical, sometimes subtle. As one respondent stated, one must control the vocabulary used in discussing the search services and data available. It is easy to overlook the drawbacks of online searching because, in the eyes of the industry and loyal users, the advantages are so remarkable.

Yet respondents stated that sales people are trained to present the service accurately and consistently. Realistic assessment of the ease or difficulty of using a search system is important. Making searching sound easier than it is can be misleading and frustrating to the searcher. In the long run, the customer is better satisfied, more loyal, and (one hopes) more profitable to the service provider with an unvarnished understanding of the online services available.

It is often difficult to separate communications to customers about the search system from explanations about the data available through the search system. As a result, search service marketing may be more difficult than strict database marketing, because knowledge of many databases is expected in addition to a thorough understanding of the mechanics of the search system.

For this reason, database distributors take two marketing approaches. They tend to focus on data content at a general level in their overall marketing material and sales presentations, while relying on methods such as subject specialists, documentation, training, and database publishers for more detailed presentations. The approach will depend, too, upon the level of expertise of the customer being addressed and whether the focus is an initial sale or an attempt to increase usage among current users.

Database publishers tend to market their database(s) only to current online users by focusing on the content and ease of access to that content. They frequently know competitive databases in some depth in order to sell more effectively against them. However, database publishers need to understand the search service only to the extent that it

works with their database (and not all search-system features apply to all databases). Most database publishers' marketing material focuses on applications of the database and special features of a search service only if the feature is relevant to their database.

Clear communication of editorial policy and data content are critical. The database publisher and the subject specialist working for a database distributor tend to be the most knowledgeable about content and are called upon as needed. For example, a subject specialist in legal research will attend a trade show for law librarians in order to provide the expertise that that customer group will expect.

K. Appropriate Applications

A database producer should suggest appropriate applications for the database. What sorts of questions can and cannot be answered using this data? For example, one needs to know that the Trademarkscan-Federal database covers active trademarks, servicemarks, and applications for registration filed at the U.S. Patent and Trademark Office, while trademarks and servicemarks registered with the secretaries of state of each of the states are covered in a different database, Trademarkscan-State.[59] Another database, Disclosure, contains financial information on public companies but not on private companies.[60]

L. User Training and Documentation

1. *Database Publishers*

To further support a well-designed database, a producer ought to provide adequate documentation and user training. This reinforces the database scope and coverage definition and the understanding of the data elements. Without adequate training or reference material, a searcher may be unable to use the full power of the database, missing critical information that would otherwise be available. A number of database producers publish regular newsletters (often free of charge), users' manuals, source guides, thesauri, and subject guides of controlled vocabulary.

In addition, database producers contribute information about specific databases to publications available from database distributors. These include database directories, fact sheets (one- or two-page descriptions of editorial content, searchable fields, etc.), newsletters, and entire chapters of large manuals on how to use a specific database most effectively.

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59. *Dialog Database Catalog* 82 (Palo Alto, CA: Dialog Information Servs. 1991).

60. *Dow Jones/News Retrieval User's Guide* 78 (Princeton, NJ: Dow Jones & Co. 1991).

Many database producers regard hands-on training sessions as critical for disseminating knowledge about their databases. Some database publishers train users free of charge while other producers charge a nominal fee. In any case, to encourage user attendance, the seminars rarely cost much. The seminars range from full-day sessions covering the fundamentals of searching and editorial coverage to shorter updates for advanced techniques and tips. Sometimes, database producers offer sessions jointly and train searchers not only on several specific databases but also on their complementary nature.

In training, as well as in the area of documentation, database producers often work closely with database distributors. The databases may be featured within a general subject area session offered by the database distributor focusing on business, legal, chemical, or other specialized topics. Some database distributors, notably Dialog, conduct regular Updates, gathering users together for a number of workshops that feature specific databases and specific applications. The Updates are sponsored by Dialog, yet the sessions are conducted by both Dialog staff and that of database producers.

One respondent pointed out that database services do not universally permit the inclusion of online scope notes, tables of contents, or lists of sources that might be used to update users with the most recent changes in the database. Since printed material is often rapidly out of date and online databases can be changed easily, more real-time updating of documentation would be an advantage. However, this alternative is not, to this author's knowledge, widely available.

2. *Database Distributors*

As mentioned above, database publishers and database distributors partner in creating documentation for database content and some types of user training. Search services are responsible for training customers in the basics and the fine points of searching their system.

To this end, many distributors provide different levels of training ranging from introduction to searching and basic methods to advanced tips and techniques. Because certain search capabilities are used most often within specific disciplines, specialized subject seminars (bankruptcy, chemistry, etc.) are also important ways to educate users. These specialized seminars presuppose basic knowledge of searching, building upon a foundation already established.

Documentation follows this model as well. There are a variety of general printed tools, such as search manuals, guides to basic searching, and "hard cards" printed with basic commands on them. Some of this material is designed for training sessions, while some of it is intended as marketing collateral but ends up as a user's reference guide.

Advanced documentation, once again, presupposes a fundamental understanding of the basic search system and, frequently, of the subject specialty presented. To use a patent database effectively, one must understand the principles behind patent categories and the criteria for successful patent applications. Thus the documentation for a patent database teaches how one can use the database to support these objectives but does not teach the basics of patents.

M. CUSTOMER SERVICE

1. *Database Publishers*

Some database publishers provide telephone customer service for end users. This may be via a toll-free hotline available for extended business hours or through a toll call during normal business hours. Those publishers who provide such a service seem to agree that it allows a searcher to get the best advice possible about the content of the database and how to structure a particular query most appropriately for the database on a particular service. Among the respondents interviewed there seemed to be little or no concern about service levels (number of calls answered within a certain time frame or number of calls abandoned). This is probably because the level of calls is both sufficiently low and reasonably predictable in timing. Also, telephone aid is not seen as the primary service the database publisher provides.

2. *Database Distributors*

Most search services provide customer-service hotlines to assist users. Because online searching provides immediate gratification and speedy results, users value real-time assistance. Many of the hotlines are toll-free (e.g., Mead Data Central, Reuters, Dialog), but others require the user to pay the cost of the call (e.g., Dow Jones News/Retrieval). The hours of availability vary.[61]

Because of the breadth of databases offered, the customer-service staff must be knowledgeable about data content, system-specific search techniques, and user hardware and software. These representatives are called upon to answer a wide array of questions and often specialize in order to provide the customer the best service possible. A good cus-

61. Dow Jones/News Retrieval provides service from 8 a.m. to midnight, Monday through Friday, and 9 a.m. to 6 p.m. on Saturday, Eastern Time (*Dow Jones News/ Retrieval User's Guide*, 1991, inside front cover). Dialog provides service toll-free from 6 a.m. to midnight, Monday through Thursday; 6 a.m. to 9 p.m., Friday; 7 a.m. to 3 p.m., Saturday; and 3:30 p.m. to midnight, Sunday; Pacific Time (Temporary hours as of 21 April 1991 according to recording on customer-service hotline). Mead Data Central provides service toll-free 24 hours/day except 2 a.m. to 10 a.m., Sunday (according to customer service representatives as of 21 April 1991).

tomer-service person can help users get meaningful search results without the frustration of looking through what may seem to be obscure or irrelevant documentation. This personalized service is believed to go a long way toward creating satisfied users.

N. TELECOMMUNICATIONS

The telecommunications networks play a vital role in the delivery of electronic information. Their involvement includes transmission of files between producers and search services as well as the more complex role of providing a link for interactive searching between users and services.

Database publishers, distributors, end users, and telecommunications networks alike agree that the state of the art for data transmission has improved radically over the last decade. The technology has improved to the point where problems that were once quite common, such as timing out (being dropped from a host/user connection), are much more infrequent.

Most database services rely on some form of packet-switched networking for interactive searching. Packet networks send messages as small bundles of information or packets. Most messages are divided into many packets shipped separately through the network and reassembled into a complete message at the other end. This allows efficient use of the network by creating a virtual circuit, rather than a physical path, for each call and permitting many calls to share the same physical path.

Packet switching requires extensive error checking at multiple points to assure that the information going into the network is the same coming out the other end. That this error checking benefits online searchers is really only a side effect of the packet-switching network design.

The greatest weakness in the uncorrupted transmission of data through packet-switching networks seems to be in the local access link. For a searcher to connect to the distributing host, a local phone call to the nearest network node is usually required. This call to the nearest network mode relies upon the local phone company's lines. In many locales today, those lines are of lower quality than the lines relied upon for network transmission. Copper wire does not provide the same fidelity of transmission as optic-fiber cable—an increasingly large component of the long-line networks.[62]

62. S. SCHATT & S. FOX, VOICE/DATA TELECOMMUNICATIONS FOR BUSINESS 117 & Ch. 7, *Packet Switched Networks*. (Englewood Cliffs, NJ: Prentice-Hall 1990).

Other deficiencies may include insufficient ports into the selected network, where a user effectively receives a busy signal from the carrier; insufficient ports from the carrier into the host, where the busy signal occurs between the carrier and the host; or the unavailability of the telecommunications system because of hardware or software failure. Symptoms of local hardware or software problems include a ring but no answer and fast busy signals.

In an attempt to reduce reliance on dial-up packet networks and to improve the quality of service, several distributors now offer access through their own networks. The main advantage appears not to be improved quality (as experienced by the user) but reduced cost to the user. In point of fact, many of these private networks use parts of the public packet-switched network for completion of calls between a user and a distributing host. Some search services actually lease physical lines and maintain them (or contract for their maintenance), but this type of private network service is much less common than the virtual network option. A private network agreement gives the database distributor more control over the network and often guarantees a certain level of capacity. Local mode access remains problematic because, under almost all circumstances, these initial telecommunications links route along local phone company lines.

Some database distributors rely exclusively upon the public networks but contract with a number of different networks (thereby reducing their reliance upon a single carrier and providing additional points of local access to the distributors' end users). Others use the public network as a backup or extension to their private network. Should the private network fail, users can log in over the public network (again, increasing reliability and alternative points of entry for end users).

Data transmission requires that a reliable, clean, usually dedicated telephone line deliver digital information at a high speed. Something may interfere with the clean transmission of data and garble the message. Or the data transmission may be interrupted and therefore an entire set of data lost.

Data transmission may be the most nebulous area in which to pinpoint problems. Once data leaves the source site, be it the producer, the host, or the user's own terminal, tracking a problem is difficult. Commercial networks have little incentive to spend the time necessary to track individual problems. They tend to devote their energies to systemic problems (does the network fail at 10 a.m. every Monday during peak search periods?). If a problem cannot be duplicated, it cannot be diagnosed. Unless the user has an uncanny ability to reconstruct the steps that precipitated the problem, it may never occur again in exactly

the same fashion. Without a clear signal that systemic problems exist, effective troubleshooting is next to impossible.

O. THE SEARCH INTERMEDIARY

Search intermediaries vary in their level of concern about information liability and therefore in the way they approach the issue. In spite of the increasing press about contracts, not every professional searcher requires them of his or her clients. Some prefer to "educate" their clients about the limits of online searching and rely upon personal rapport as protection against potential litigation.

Effective information brokering requires careful balancing of budget constraints against comprehensive searching. The respondents indicated that they spend time explaining to customers that costs can be reduced by limiting a search to a certain time period (say, the most recent twelve months' information) or by narrowing the question. The trade-off, of course, is the completeness of the search. As one of the predominant concerns among the intermediaries is failure to locate a key piece of information, these trade-offs of cost versus comprehensiveness are important.

All of the intermediary respondents emphasized that improving and maintaining their own searching expertise is an essential part of their professional development. Competence is, in their eyes, the best defense against any charges of professional liability. These information brokers see superior performance as the optimal way to avoid problems with clients. As a corollary, if they do not believe that they have the expertise to conduct a search in a particular subject area, they will not accept the commission. If possible, they would refer the request to a specialist in that field. For example, one respondent mentioned chemistry as an area that she did not feel comfortable researching.

P. USER RESPONSIBILITY

1. *Equipment*

Hardware and software problems on the user's end may also contribute to bad data. Some printers have a tendency to drop characters at the end of a line. One zero lost from a numeric database may affect one's buy or sell decision. A bad cable, a bad cable connection, or wrong printer settings can generate meaningless output as well.[63] Software programs converting personal computers into ASCII terminals may not function properly, losing data or critical communications prompts. Whose fault is that? Most of the respondents agreed that the user must

63. Freedman & Carlin, *What to Do When It All Goes Wrong*, LIBRARY J., Dec. 1985, at 73.

take responsibility for the proper functioning of his or her software and hardware.

2. *Search Skills*

To retrieve relevant information requires astute questioning. Searchers fail in two ways. They ask the wrong question or they ask the right question the wrong way. Asking the right question is a matter of understanding what one really wants to know. "Give me information about pilot instrumentation" is quite a different question from "Have there been reported problems with the new X-brand altimeter installed in commuter airplanes?"

Asking the wrong questions is not a problem unique to online searching, but online access makes it a more frequent issue. When researching a question in printed material, one obtains a great deal of information serendipitously via browsing. Relevant information may be proximate to the irrelevant information originally perused. Online databases are not browsable in the same way that magazines, books, or even file folders of articles are. So fortuitous discovery of relevant data frequently does not occur as often online.

A searcher with no understanding of online database structure and query language will not successfully frame his or her question. Failure to phrase the query correctly will retrieve spurious results, too many, too few, or none at all.

Obtaining no search results does not necessarily mean that the information desired is not present within the database. It may instead indicate that the question asked would not find the data. Searchers must use date limiters, author or journal name restrictions, proximity terms, or even truncated words to more precisely define the question. Nor does failure to find information mean that it does not exist at all. Searching a machine-readable database does not relieve one of the requirement to select an appropriate information source. The searchers interviewed for this study stated that one of their greatest concerns with online searching was the retrieval of no relevant information from a search. How could they know that there really was no information on the subject?

A wise searcher utilizes all the tools at his or her disposal to become an educated searcher. Manuals, training sessions, and customer-service hotlines can all improve the finesse of a search. In this respect, end users have the same responsibilities as intermediaries. The difference is that end-user searchers bear the ultimate responsibility for the efficacy of their searching. Intermediaries pass on the information to an information user, usually for a fee.

3. *Appropriate Use of the Information*

The searcher also bears a certain amount of responsibility for proper use of the information retrieved. Data must be double-checked for reasonability. For example, no one should buy or sell a business based on a single valuation of the property, regardless of the source. If two sources provide widely disparate numbers, a third source ought to be checked. This is no different from the process used for print sources. In all cases, having more experience with a particular type of data makes it easier to check for reasonability.

Lawyers purport to be particularly careful about the appropriate use of online information. Two respondents said that they preferred online searches for general background information and to locate a specific piece of information. Once located, they would then return to the original source to double-check the information. For example, an online search might locate a full transcription of a real property record. However, for submission as evidence in court, a certified copy of the original document would be obtained from the proper agency of record.

Q. LEGAL TACTICS

The foregoing sections have reviewed the respondents' concerns about marketplace liability and some of the tactics used to minimize risk in that area. The focus for reducing marketplace liability has been on operational processes and procedures to maintain and improve the quality of the data, the search system, the telecommunications network, and the skill used to obtain and evaluate the information itself. The premise underlying these approaches is that the best defense is a good offense or that the proactive improvement of quality can head off problems before they arise. Nevertheless, the consensus was that a good defense is still a good idea.

Hence, the following sections address the tactics used to hedge against risk from a strictly legal standpoint. The focus is upon the contracts entered into by the parties participating in the search process. Three types of agreements are discussed: those between database producers and distributors, those between database distributors and end users, and those between database distributors and telecommunications networks. Agreements between information users and search intermediaries are not evaluated. The respondents in this study did not use them.

1. *Agreements Between Database Producers and Distributors*

Contracts between the database producer and distributor often include clauses indemnifying both parties against certain third-party

claims. The following example is from a model Executive Telecom System, Inc., license agreement:

> A. XYZ Corporation will, at its expense, indemnify and defend against any claim or action brought against ETSI based on, as a result of, or in connection with: (1) any claim that any material and/or information furnished hereunder and used within the scope of this Agreement infringes any patent, copyright, or others rights of any third party. . . .
>
> B. ETSI will at its expense indemnify and defend XYZ Corporation against any claim or action brought against XYZ Corporation based on, as a result of, or in connection with: (1) any claim that ETSI hardware and/or software, or representations of ABC Network by ETSI representatives as presented on HRIN, caused damages to any third parties. . . .[64]

While such clauses provide some protection to the business, they cannot prevent dissatisfied users from suing. The indemnifications provide recourse for the sued party to place financial responsibility elsewhere in the specific circumstances described. However, this second layer of "protection" or sharing the potential damages is an important step. It forces both parties not only to focus on their own responsibilities, but also to be conscious of the interrelationships between the business partners.

Database producers also rely on strong disclaimers of fitness or warranty. Contracts with database distributors often include such clauses and require that these statements be prominently displayed to users of the database under license.

2. *Agreements Between Database Distributors and End Users*

To this author's knowledge, all commercial online services require users to subscribe to the terms of a user agreement, effectively creating a contract between the parties. Some search services require a signature to document the acceptance of stated terms; others allow use of the service itself to indicate agreement. The Dow Jones News/Retrieval user agreement begins: "READ THIS USER AGREEMENT BEFORE USING DOW JONES NEWS/RETRIEVAL (the "SERVICE"). BY USING THE SERVICE, YOU AGREE TO BE BOUND BY THE FOLLOWING TERMS."[65]

User agreements usually spell out charges and payment terms, any limitations on use, and a whole host of disclaimers and disclosures. As an example, Disclosure, Inc., includes the following disclaimer in Mead Data Central's subscription agreement:

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64. CONTRACTS IN THE INFORMATION INDUSTRY II, at 28 (L. Isenman, ed.) (Information Indus. Ass'n 1990).

65. *Dow Jones News/Retrieval User's Guide*, at iv. (1991).

> Disclosure Inc. makes no warranties as to the accuracy or completeness of the information contained in Disclosure Online Database. DISCLOSURE INC. MAKES NO WARRANTY, EXPRESS OR IMPLIED, AS TO ANY MATTER WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH REGARD TO DISCLOSURE ONLINE DATABASE. Disclosure Inc. shall not be responsible for any loss or damage caused as a result of the use of the information contained in Disclosure Online Database.[66]

Ironically, such a statement may hurt the company in the marketplace, casting doubts on the quality of the data; but, from a legal perspective, it seems a wise preventative measure.

3. *Agreements Between Database Distributors and Telecommunications Providers*

Telecommunications networks contract to provide links between the database distributor's mainframe computer(s) and the numerous terminals by which customers access the database distribution system. This section discusses the portions of the contractual agreements between the search service and the telecommunications network that may be relevant to questions of information liability.

Often, the customer's terminal is a personal computer configured to act as a dumb terminal. Sometimes the database distributor provides the software used to configure the customer's PC and to make the network connection; at other times the customer uses third-party software to make the connection. The network provider does not, generally, have any involvement with the software that accesses the network. The network responsibility begins with the transmission of data from the end user and carries through the network to the host computer, then back to the end user.

The contract for network services often specifies performance standards and warranties as well as limitations of liability and indemnities. These two areas have the most bearing upon the information liability issue. Whether the contract is for public or private network access does not seem to matter; performance standards and warranties, along with limitations of liability and indemnities, are called for in either case.

While the precise standards of performance will vary by contract, they may include items such as throughput, non-modification of data, hours of availability, response time and standards for correcting problems. These standards should be clearly defined, explicit and measurable. Standards set the expectations of both parties to the agree-

66. *Supplemental Terms for Specific Materials: January 1, 1990* (Dayton, OH: Mead Data Central 1990).

ment. In turn, the search service may use the understanding reached in the network contract to set certain expectations among its customers (such as the hours of availability for the search service).

A throughput standard might be defined as 96% of the data transfer rate for the line between the end user and the network access node. This means that using a 1200 baud modem would transmit at least 115 characters of data per second. Standards of throughput are important to customers, who often pay connect time (and slower throughput means more time online at a higher cost), as well as for efficient use of a host system.

Non-modification refers to accurate transmission of information. Data should be transmitted without changing, dropping, or adding characters at an agreed-upon level of accuracy. A sample standard would be: user data must be received as sent 99.95% of the time. The importance of this standard is obvious. Questions and answers must be exchanged accurately for a satisfactory search.

Network availability is usually specified by time of day and day of the week. If the service is not required to be available on specific holidays, that is usually defined. This affects the maintenance of the network because servicing must not interfere with the specified hours of availability. From the end user's perspective, the search system should be functional during advertised hours and the network is an essential component of that availability.

Response time means the elapsed time between the transmission of the last character of a command from the user to the receipt of the first character of the host response. This differs from throughput in that response time is usually measured by the number of seconds in which packets of information are received (long packets may have a different performance standard than short packets).

Limitations of liability and *indemnities* protect the network provider and the search service from the consequences of certain events. Liability might be limited to a flat dollar amount or to an amount determined as a function of past payments. Other creative methods of arriving at a dollar amount are certainly possible. Under any well-defined formula, both parties know the precise limits of their liability and have agreed to it by signing a contract. This reduces the risk between the partners to a known quantity.

Indemnities between the telecommunications supplier and the database distributor are conceptually like those between the database publisher and distributor. The specified first party agrees to indemnify, hold harmless, and defend against losses, damages, liabilities, etc., that result from claims by third parties against the second party when the first party is alleged or determined to be at fault. For example, if some-

one sues the network for a problem caused by the database distributor, the database distributor will defend against the suit, pay for any expenses and damages, and not rely upon the network to defend itself against problems the distributor caused. Generally, the indemnification clauses call for prompt notice of any claim or proceeding that might fall into this area and for cooperation in defending or settling any claims.

V. CONCLUSIONS AND RECOMMENDATIONS

This study suggests that the electronic information industry has many ways of limiting its information liability. The judicious use of contracts and disclaimers, careful planning and implementation of quality control and assurance processes and procedures, thorough education of end users, and the innovative use of changing technology are logical means to lessen the likelihood of litigation. Each of these tools should be used to the greatest extent possible.

The risk/benefit trade-off for each organization will determine to what extent these safeguards are implemented. For large organizations with a significant revenue stream or substantial assets at risk the conservative approach would be to implement as many of these recommendations as feasible. For the smaller organization, with fewer resources to devote to protecting against information liability, the full range of safeguards may not be possible. However, because litigants tend to target the "deep pockets," smaller organizations may not be as much at risk as larger firms. Claimants prefer to sue when the potential return is greater.

Above all, the reader should remember that litigation and claims cannot be prevented. Only the likelihood of their occurrence and the opportunity for damages found can be reduced. The organization's goal must be to satisfy the customer at an acceptable cost and thereby reduce the likelihood of legal claims and damage to the firm's good name in the marketplace.

A. CONTRACTS

Contracts are the defensive approach to information liability. Should claims arise, contracts can be used to demonstrate the defendant's efforts to notify customers of limitations on the service provided. They also give notice of remedies available to the dissatisfied consumer as a hedge against extravagant claims. This does not mean that contracts provide ironclad protection; in extreme circumstances, they only serve to mitigate plaintiffs' claims for recompense or damages awarded.

1. *User Agreements*

Every database distributor should require that new subscribers accept and acknowledge the terms of a user agreement. The agreement should disclaim clearly and explicitly any and all warranties, including merchantability and fitness for a particular purpose of the service and the databases provided through the service. The agreement should state that the subscriber uses the service at his or her own risk and assumes all responsibility for the consequences of its use. Compensation for an unsatisfactory search should be limited to the cost of the search plus any related charges (such as document printing charges, telecommunications and information units).

The agreement should be worded so that initial use of the service indicates understanding and acceptance of the terms and conditions contained therein. Ideally, the agreement will be displayed online upon first sign-on and a new subscriber will be unable to use the service without first viewing the user agreement. This eliminates the possibility of a paperwork foul-up permitting first-time online access before review and acceptance of the user agreement. Review would happen automatically. Subscribers should also receive an initial printed copy of the user agreement and a copy each time the terms and conditions change. The most conservative approach calls for copies to be distributed yearly, perhaps upon the anniversary date of the initial subscription.

Terms and disclaimers for specific databases available through the service should be included in the user agreement. A provision for online display and review of these terms is also desirable. A cautious distributor will provide mandatory display of online legal disclaimers free of charge. This way, searchers cannot avoid viewing the disclaimers. Displaying the information at no cost to the consumer will somewhat alleviate the inevitable complaints about increasing online time. (Online searchers are notoriously impatient to complete their searches quickly and often ask how to avoid even the informational displays that appear just after initial sign-on.) Required displays will not guarantee that the searcher has indeed read and understood the disclaimers, but it gives credence to the database distributor's attempts to communicate these disclaimers to the user community.

2. *Contracts Between Database Publishers and Distributors*

The contract licensing distribution of a particular database should include indemnities of both parties. The database producer does not want to be liable for errors introduced by the distributor and vice versa. While a dissatisfied customer may sue each link in the information chain, it is unlikely that each link caused or contributed actively to the problem. Indemnification clauses provide a mechanism whereby the

party responsible for the problem bears the costs associated with a claim from a third party (probably a user) in all instances, even if the organization at fault was not named in the suit.

The information provider should disclaim any and all warranties, including merchantability and fitness for a particular purpose of the database. Furthermore, the method of communicating these disclaimers to the end user should be defined in the license agreement between the database publisher and distributor to the point of specifying the words to be used in the message.

Update schedules, data to be delivered, format requirements, advance notice required for format changes, as well as a timetable and the procedures to resolve problems, should each be enumerated within the contract. This provides a contractual impetus for adhering to agreed-upon schedules and procedures. For less popular databases, the contractual nature of the standards may be necessary to motivate compliance. (Databases in greater demand might receive more careful attention in maintenance and updating simply because there is a greater financial incentive to keep these databases current.) Users should be notified if update delays occur and the notification method should be specified within the agreement. Again, the preferred means is online, free of charge to the searcher.

The contract should detail the process for correcting errors identified within the database. There are two levels of correction required—normal and emergency. The publisher and distributor should agree in advance what constitutes an emergency. (A reasonable definition would be the threat of imminent lawsuit or danger to life.) Emergency corrections ought to be made within twenty-four hours of notification.

The contract also should detail how to identify and verify an error, whom to notify, how to notify that person or department (e.g., in writing or by telephone), and what steps to take to make the correction. Can the database distributor make the correction upon verbal approval from the database publisher? Must a correction be received in writing? Or, for a normal correction, should the correction wait upon a machine-readable replacement record within the next regularly scheduled update?

What is an acceptable timetable for normal corrections? A daily database could be updated the next day, but a directory that is updated once a year should hardly wait until the next annual update to correct a mistake. How does one verify that a correction has been made accurately? Is there a quality control process for corrections?

Each of these questions should be answered to both parties' satisfaction and recorded or referred to in the contract. For convenience, the contract might incorporate by reference a technical plan or service

agreement. This addendum could then be revised, as mutually agreed upon, throughout the life of the contract without a formal contract negotiation.

The burgeoning of new media suggests that information providers should construct distribution contracts carefully to anticipate as-yet-undefined channels of distribution. Many agreements between information providers and distributors are for three- to five-year terms. The rapid pace of change for information-processing technology means that a whole new mechanism for distribution may be developed during the life of a contract. It will be critical, in the face of technological change, for database publishers to control the distribution of their own information and their exposure to product liability.

3. *Contracts Between Database Distributors and Telecommunications Networks*

Contracts between distributors and telecommunications networks should not only specify hours of availability, service levels, acceptable error rates, timetables for problem resolution, and procedures for reengineering capacity should it become necessary, but also include indemnities for both parties.

One of the biggest risks for the delivery of electronic information is that of providing sufficient local node access. To the extent possible, a minimum level of access should be defined. Depending on the term of the contract, one might also opt for the ability to reevaluate and redefine minimum capacity at various times throughout the life of the contract. This would enable a rapidly growing search service to request additional capacity from the network without requiring a renegotiation of the entire contract.

There seems to be no solution, at this time, to the possible problems presented by use of the local phone company to access a network node. The delivery of that service is based upon an agreement between the end user and the phone company and, as far as this author knows, does not explicitly guarantee connection or accuracy. Because those service levels are based upon voice-grade delivery, not data transmission requirements, even implicit standards probably do not apply. When and if an end user subscribes to a data-grade service the situation may change. However, most end users do not need and do not want to pay for a data-quality line to their home or business simply for online searching.

Unlike the requirements for database publishers and distributors to post disclaimers and notices of limited liability for users to accept, no specific communications to end users by the network providers seem to be required. For the most part, the role of the telecommunications network is transparent to the end user. Ideally, it remains that way.

4. *Contracts Between Search Intermediaries and Clients*

Cautious information specialists will provide services to their clients based on a written contract, which should include specific disclaimers. Those disclaimers will describe the limitations of online searching, pass through the database and search service disclaimers to the intermediary's clients, and limit recompense for unsatisfactory results to the cost of the service provided by the information specialist. It would be wise to include some of these disclaimers in any brochures or advertisements that the intermediary uses to market his or her services.

This recommendation does not apply to employees who provide search services to fellow employees (such as the corporate librarian). Nor does it apply to the reference librarian who conducts an online search for a student at no cost. The worst case here would be loss of one's job, rather than being sued for services performed. However, the reference librarian who conducts an online search and whose library charges back the direct costs of the search might consider an agreement, signed by the patron, that acknowledges the limitations of online searching and disclaims the accuracy and completeness of the information provided.

These contracts should be supplemented in two ways. First, the intermediary should be competent to conduct a specific search and decline the job if it requires specialized knowledge that he or she does not possess. Second, the information specialist should educate the client about the limitations of online searching, as well as the benefits, so that a client's expectations are reasonable. This education will also build a rapport with the client that should make the entire business relationship more effective.

Malpractice insurance, if available, is desirable. Given the seeming dearth of this coverage, concerned information specialists might band together to seek an insurance carrier for this type of insurance. If the risk pool is large enough several carriers would be willing to write a policy providing the kind of insurance intermediaries have described. A professional association that represents or includes large numbers of intermediaries easily could be the moving force behind obtaining this coverage. The Special Libraries Association or the Association of Independent Information Professionals are two likely candidates for this task.

B. Database Design and Editorial Policy

Information providers must create a well-designed database with a clear editorial policy. The policy should be consistently applied in the creation of the database and communicated clearly to the database users.

Many examples of well-designed databases exist. The precise style and data elements of the database will depend upon the nature of the information. For example, a file of legal opinions should include not just the text of the opinion but the name of the judge rendering the decision, the court, the date of the opinion and so on. Many of these data elements are irrelevant for a bibliographic database of general business articles. The database designer must be sensitive to the material and to the searcher's likely use of the information.

For a database indexing, abstracting, or providing the full text of a publication, the coverage of that publication must be clear. Is it only long articles, all articles except personnel squibs, or all material except advertisements included in a particular magazine? Once decided, coverage must be consistent. It should not change from update to update. If, for some reason, coverage must change it should, once again be clearly communicated by as many means as possible.

It is necessary to communicate scope and content of the database in print. Search service guides or directories, user manuals, subject guides, journal lists, updates in newsletters— anything and everything available should be considered. Ideally, this information also resides online and is therefore more easily disseminated.

Database distributors must update their material describing database content and suggested applications in a timely manner. Requests to database publishers for information about database changes should be formal and regularly scheduled, and the resulting publication of changes should occur regularly as well. A database producer should edit and proofread anything published about its databases. The database publisher is the ultimate authority on database content and suggested applications of the information.

Indexers and abstractors need to be trained thoroughly and formally. To ensure consistency, every editorial staff member should receive the same general training in style, subject heading assignment, structure of abstracts, and so forth. A regular review process is required to monitor adherence to the established standards, with retraining and refreshers provided as frequently as needed. By investing in continuity of staff the database producer will reduce the amount of turnover and subsequent retraining required. A quality assurance team is also recommended to look at new ways to improve the quality of the databases and to constantly review the processes in place.

Automatic indexing and abstracting tools will free the staff to solve intellectual problems—e.g., "What is the correct descriptor for this article?"—rather than to deal with the mundane issues that computers can handle for them. Automation should extend to spell checking for required fields, tables of approved entries (company names, personal

names, publication names, etc.), and interactive flagging of errors to improve accuracy and, not incidentally, to improve productivity.

The need to rekey information should be eliminated as much as possible. Index and abstract records can be created directly on a terminal or personal computer so that the information can be concatenated by computer rather than retyped by a data-entry clerk. Reentering the full text of an article from a print version should be avoided. Rather, the producer should work with the author or original publisher to develop a machine-readable file of the original material. If formats are standardized, multiple sources can provide digital data without requiring conversion to a system-compatible format. This will reduce the likelihood of error and the cost of maintaining many different customized conversion programs.

C. Updates and Error Correction

Database distributors must train staff members who receive and load database materials in the details of their assigned databases. These technicians should become experts in content, data elements and format so that they can spot problems and develop solutions quickly. These people need at least two backups to allow for vacations, illness and the normal interruptions of people's lives.

Database distributors need to develop automated checks for the presence of required data in the correct format before loading the database. Reliance on human checks can then be reduced without eliminating the checks entirely. These software programs must be customized for each database and search service. In all likelihood the improved productivity will pay for the cost of the program development. More problems will be identified earlier and solved more readily before they become severe.

A sense of teamwork between the database producer and the database distributor can be created by identifying contacts on both sides and encouraging formal and informal communications. This helps develop a mutual sense of ownership that reinforces the contractual agreement. Communications channels should be designed to make problem resolution routine rather than difficult.

The error-correction process needs to be tested regularly to ensure that it will work when needed. The database distributor might do well to consider it a cost of doing business to guarantee that the mechanism is in place should it be required. Providing an easy way for a customer to report a problem with the service or the information, fixing mistakes promptly, and letting the complainant know when the correction has been made will enhance the organization's image of responsiveness.

Information newly added to the database should be sampled to ensure that it has been loaded correctly. This should be done continually and regularly, not just every once in a while. All search parameters for a record under review need to be exercised—to assure that the search service works as planned, not just to ascertain the presence or absence of updated data.

Database distributors should consider cleaning up old files rife with dirty data and reloading the new version, particularly if the database in question is bibliographic. Current data may be very clean and well accepted, but if the older information does not meet the same standards the errors will overshadow the improvements made. Retrospective cleanup is expensive but for frequently used, large files it may be well worth the cost.

This author agrees that occasional typographical errors are much less important in full-text databases and so probably not worth the expense of identifying and correcting. However, misspellings in a bibliographic database relying upon controlled vocabulary could interfere significantly with the retrieval of relevant records. In this instance, database cleanup would be worthwhile. Otherwise, some records might never be accessed.

D. Search Service Enhancements

The search and retrieval software should be enhanced, but this process should be approached thoughtfully and carefully. While it is outside the scope of this study to recommend specific changes to any searching mechanism, it is well within the scope to address the implications of making a change. In all cases the database distributor must be certain that both the power and the limitations of the changes are clearly and extensively communicated to customers as soon as possible.

A lesson can be taken from the implementation of multiple-file searching with a single command—a capability now provided by a number of search systems. Initially, this enhancement highlighted the retrieval of duplicate citations (a reference to the same article from several different databases)—a result that dissatisfied a number of voluble customers. Anticipating that reaction and developing a solution *before* introducing the cross-file search might have been a better approach.

Most search services need to publish more and better documentation online and make it easy (and inexpensive) to view in the relevant places. Isolating this information in a single location (as Dow Jones does in \\FYI) makes it easy to find and simple to maintain from the database distributor's standpoint, but it does not ensure that the searcher who needs to see it will do so. If a searcher must be proactive to find and review documentation online, he or she is less likely to do

so. If the information automatically appears in the appropriate place (e.g., in an update bulletin just before a search is constructed), then it is more likely to be read and digested by the searcher.

E. Customer Service

Customer service should be a showpiece. Staff should be trained impeccably in information content, searching techniques, and interacting with customers over the telephone. Experience counts. Every effort should be made to develop and keep a knowledgeable, effective customer-service staff in place. The payoff will be a satisfied group of customers who have positive perceptions about their requests for assistance.

Ideally a user can reach customer service in a number of ways: via telephone, in writing (though most people need more immediate assistance), and online through electronic mail and interactively. If a service relies upon electronic mail, a regular schedule for response should be set up and adhered to. While it may be difficult to justify the cost of twenty-four-hour-a-day customer-service availability, extended hours of service (particularly on the weekend) are preferable to regular business hours.

F. Customer Expectations

Listen to the customer. A satisfied customer will not be troubled by minor difficulties with retrieving information or occasional typographical errors in the text of a seven-page article. However, a problem that a customer takes the time to identify and complain about should be remedied as soon as humanly and systematically possible. If complaints are repetitive, it is likely that a systemic problem exists and a concerted action required to fix it.

Help set customer expectations. Training, documentation, marketing materials, every communication with the customer must be consistent, accurate and well balanced. Online searching is not the answer to everyone's research problem or information need. It is unwise to present it that way. The limitations of a database and online searching should be as clear and obvious as the benefits.

Set expectations, as well, for the kinds of questions that can be answered by information within a specific database. Here again, communication with the end user is critical. Online searching answers only the question asked and only within the databases searched. Therefore, matching the right question to the right database(s) determines success. Database producers, database distributors and intermediary information professionals can each help create a successful search by identifying and reinforcing the appropriate use of specific databases and search services.

Do not overpromise. The searcher should be reminded of his or her responsibility to select the most appropriate information source, online or offline. Only the researcher can evaluate adequately the reasonability of the data retrieved and whether it applies to the question at hand.

G. Future Implications

The United States lacks comprehensive legislation or extensive case law dealing with information liability (or information technology at all) and thus must resort to case-by-case precedent setting. No major decisions have been rendered in this area since 1985 and 1987 when the *Dun & Bradstreet v. Greenmoss*, *Jeppesen* and *Daniel v. Dow Jones* cases were concluded. The decisions in the first two cases were controversial, and as a result, information providers are uncertain of their legal rights and obligations. No database publisher or search service wants to settle differences with a customer in court. Therefore, the emphasis will continue to be upon avoiding the court-mandated solution by continual improvement of electronic information delivery.

Given the nature of the U.S. legal system, legislation does not appear to be a useful way to resolve uncertainty about information liability. There are no particular wrongs to be righted or rights to be protected. The current technology for developing online databases and searching is quite good but it is not perfect. However, the technology is changing so quickly that by the time legislation was enacted it would probably refer to obsolete technologies. It seems more useful to improve existing systems and design new and better ones in order to more thoroughly satisfy the market's needs for accurate, complete information.

Competition for information dollars will push bad databases out of the marketplace, force mediocre services to meet minimal standards of quality, and compel the current leaders to improve still more in order to retain their leadership position. The drive for profitability, rather than any fear of litigation, is the most compelling reason for maintaining and improving the quality of electronic information. That does not negate the need for using all the legal protections available. It is simply that the risk is, first, of not competing successfully in the marketplace, and only secondarily that of litigation. Losing one's reputation will kill a business as certainly, and sometimes even faster, than an expensive court case. It is in the marketplace, rather than in court, that the ultimate judgment will be made.

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